The Builder.

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Chemistry as an Aid in Building.

WHEN the dark halo of mystery which surrounded the mediæval alchemists gradually dissolved under the influence of the flickering rays of a new light, and the weird and secret operations which our fathers performed in their vain search for the philosopher's stone and the elixir of life became superseded by less fantastic but more useful experiments to discover, by open and systematic research, the nature and properties of the most familiar forms of matter, then was laid the true foundation of that chemical science to which the present generation is so greatly indebted.

Since the expanding force of our teeming centres of civilisation is irresistible, and Nature's scenic beauty is being thrust ever farther and farther from our homes, architecture in its highest form must daily become of greater national importance as the most powerful reactive agent against the depressing and demoralising influence of "speculative-builder" architecture; a type of architecture which, in spite of its dreary monotony, is, unfortunately, extensively adopted in our great metropolis.

That base surroundings tend to create ignoble minds is a generally admitted fact, and it is evident, therefore, that the general beauty or repulsiveness of a town is a matter of vital importance to its whole community. In most British towns, the architectural standard of business and municipal premises has risen during the last quarter of a century in a very encouraging manner, but these same towns still harbour their poorest denizens in quarters which, in their appalling sordidness, are apt to quench the final sparks of human nobleness, whilst they nurture the more fortunate thousands in streets of buildings remarkable only for lack of originality in design.

A noble edifice is one of the most valuable legacies that man can leave to future generations, yet the grandest product of the designer's hand and brain may be rendered of but passing value through inattention to those practical details of construction with which chemistry is concerned. Had more attention been given to the chemical effect of the atmosphere of London upon the stone actually employed in building the Houses of Parliament, it is probable that only the most durable stone from the quarry would have been used; the strenuous efforts of expert men of science to devise or select a satisfactory process for preserving the imposing pile from premature decay would have been unnecessary, and the valuable Report of the Royal Commissioners on the selection of stone would have produced a more satisfactory result.

The "weathering" of stones is, however, but one of a great number of subjects connected with building with which chemistry is intimately associated. "Dry rot" and "wet rot" in timber, the corrosion of metals, the "setting" of cements, the drying of oil paints and varnishes, the discolouration of certain pigments, and the effects of air and water upon quicklime are all, more or less, the results of chemical reaction. Combustion, moreover, is essentially a chemical process, yet it is the main factor to be considered in designing heating and ventilating arrangements.

Artificial building materials, particularly those of a fireproof character, are becoming every year more extensively employed; the production of many of these is dependent upon comparatively recent chemical discoveries, and many owe their commercial success to a large extent to the extraordinary reduction in the price of chemical products which has taken place during the last twenty years. Fireproof coverings for walls and ceilings, and timber made fireproof by chemical treatment, are rapidly increasing in popular favour, while artificial stone has long been a valuable article of commerce. It is too early yet to attempt to ascribe their true permanent value to many of these materials, but the increasing rate of their production is an indication that chemical science is likely to be applied more extensively in the future for the manufacture of building materials than it has been in past years; and, as man's scientific knowledge becomes more advanced, it is possible that very radical changes may be made in the size, shape, and composition of the materials employed in the erection of buildings. Already we have witnessed the common adoption of iron for girders and other purposes, and although brick and stone are unsurpassed as building materials for permanent structures, there is a growing tendency in the construction of business premises and dwellings to sacrifice durability for lessened cost and increased speed of erection; and the diminishing power or will of the average builder's operative to perform satisfactory work is likely to result in an increased use of those artificial products which can rapidly be applied by the square yard by any unskilled lad.

One cannot but feel some regret that the world now moves so fast that the business premises of the father are incapable of being adapted to the requirements of the son; with the result that many strong and interesting buildings are rased to the ground to make way for others more suited to the business necessities of the age. Some three months ago it was announced in the *Builder* that the old Post Office—that massive building on the east side of St. Martin's-le-Grand—is to be pulled down to make way for a new building better suited for the present business of the Post Office. Yet this Classic edifice was built as recently as 1825-1829. If, however, we accept the inevitable, and recognise that the cities of the future will be largely composed of buildings of more soul-inspiring design and more imposing dimensions, but of less massive and durable construction than were the cities of the past, it becomes evident that materials made by the aid of chemistry and the kindred sciences will be in great demand during the next century. But while we foresee a general advance in the architectural standard of the average erection of the future, a question which must remain unanswered is: Will the noblest erections of the future advance beyond the best of those which have come down to us from the past?

In conclusion, mention must be made of one other subject with which chemistry is concerned, and which has not hitherto received sufficient attention from builders in general, viz., the adulteration of building materials. If samples were collected and examined of all the building materials on sale in London at the present time, some surprising results would be obtained. Linseed oil is largely adulterated with mineral and resin oils, fish oil, and cotton-seed oil. White lead frequently consists mainly of barium sulphate or of chalk, but sulphate of lime

and sulphate of lead also enter occasionally into its composition, while a certain amount of clay has also been disposed of under this appellation.

Vast quantities of barium sulphate are also sold in the form of paint, but mostly under fancy names at fancy prices. Coloured pigments are notoriously the subject of gross adulteration, and "turps" and methylated spirit are not always above suspicion. A sample of cement or mortar taken from the works and subjected to analysis will oft result in strange revelations, while analyses of metal fittings are not always uninteresting.

But enough has been written to demonstrate that a knowledge of chemistry may be of considerable practical value to the builder and practising architect, and that the influence of chemical science upon building will probably increase appreciably in the immediate future. Chemistry must, of course, always hold a secondary place in the studies of the architectural student; but an elementary knowledge of its laws, and a little practical acquaintance with the common elements and their compounds, is undoubtedly desirable; and contractors would often be obliged to build with better-class materials if architects more frequently seized samples for chemical analysis.

SOME AMERICAN ARCHITECTURAL DESIGNS.

THE illustrated catalogue of the last exhibition of the T-Square Club, held at Philadelphia early in the present year, forms a document of some interest as illustrative of the present tendencies of architectural design in the United States. In noticing a catalogue of a former year's exhibition we remarked on the very French style of a large proportion of the designs illustrated, even to the method of get-up of the drawings; and the secretary, in sending us the present catalogue, is good enough to say that the managers of the exhibition have taken account of our remarks and have endeavoured to render the present collection of illustrations more representative of modern American architecture. In fact, we observe that the catalogue is prefaced by an interesting correspondence on the subject, "An Unaffected School of Modern Architecture in America—Will it Come?" apparently the result of a circular letter inviting opinions. Among the correspondents are Mr. L. H. Sullivan and Mr. Burnham (of Chicago), Mr. Carrère, Mr. Ernest Flagg, and Mr. Russell Sturgis (of New York), Professor Ware, of Columbia University; and others. The latter writer is frankly pessimistic, and considers that "our entire architectural development, since the beginning of the century, has been wholly in the direction of artificiality and self-consciousness," and that all that architects can do in the present day is to recognise the fact of their self-conscious attitude, and endeavour to express the requirements of each problem through that particular architectural style of the past which fits them most accurately. Whether Professor Ware's "our" refers to America only, or to the human race at large, is not quite clear. Other correspondents think better of the position. Mr. Burnham is of opinion that there is at present a manifest struggle going on between two camps, the archæological and the national, and that "no one who appreciates American character at its true worth" can doubt for a moment which will win the day. Mr. Sturgis thinks that "the development of a national style is a thing to look back upon, not to look forward to"—in other words, he means to say, we suppose, *nascitur, non fit*; but he thinks it an encouraging feature that so much thoughtful and careful study is given to architectural work at present, and that "composition is being recognised as paramount to detail." Mr. Carrère, on the other hand, in a long and admirably written letter, suggests that too much importance is at present attached to fashions in decorative detail; "it is somewhat as if the men interested in literature should advocate a reformed spelling, or a new vocabulary. But what makes a good literary style is the use made of the words;—not the form of the parts of speech, but the structure of the sentences, the balance of the paragraphs, and the whole movement of the composition." Architecture, he thinks, must work itself out at the hands of active practitioners, not of theorists; "and whatever the architectural language of the future may be, we may be sure that it will not be a 'Volapük.'"

This and others of the letters are very interesting, and nearly all of them contain some excellent observations. We may observe, however, that our own criticism as to the present attitude of American architects did not quite extend to the large question of the development of a modern architecture not bound by precedent. Our point was this: that, admitting that modern architecture is at present almost entirely based on past styles, there are different ways of treating these, and that there may be a national element in the treatment of architectural design, even when based on precedent. English and French architecture are both alike dependent at present on past styles, but a collection of English architectural designs is quite different in feeling, and even in manner of drawing, from a collection of French ones. But in the case of American architectural design there seems to be an absolute effort, among the younger men especially, to imitate the French manner of treatment so closely that one cannot, in fact, distinguish an American drawing from a French one; they seem both to have come out of the same mill. The imitation is even carried into adopting the bad habits of French draughtsmen, such as the inconvenient practice of merely writing on a drawing that it is to a scale of $\frac{1}{192}$, instead of drawing out a 10 ft.-to-an-inch scale on it; by which means the admirable geometrical drawings published, for instance, in the Boston *Architectural Review*, are deprived of half their value through the absence of a definite scale, merely because French drawings are so. If the American architects would leave the École des Beaux-Arts for Frenchmen, and study and develop classic materials their own way, they would achieve a certain national character in their treatment of the same materials, instead of their designs looking merely like French architecture transported across the Atlantic.

There is still a great deal of this École des Beaux-Arts element in the illustrations of the T-Square Club catalogue. "Treatment of a Focal Point in a congested quarter," by Mr. Albert Kelsey, is dated "Paris," and is apparently the work of an American student in process of being Gallicised. "A Terminal Railway Station," by Mr. A. E. Williams (University of Pennsylvania), is not apparently "made in Paris," but looks exactly as if it were, showing that the Parisian method has been carefully and conscientiously imitated in the Philadelphia school. So with "Competitive Design for New York Public Library," by Mr. J. H. Freedlander; "Design for a Ball Room," by Mr. Frank Eurish (Cornell University); design for the same by Mr. A. T. Farrell (Cornell); "Competitive Design for Bronx Park Botanical Building," by Mr. Ernest Flagg; and on page 62 we have two designs for the central feature of a railway station façade, one bearing the names of MM. Marcel & Blanc, of Paris, the other that of Mr. Donn Barber, of New York; yet so similar in design and even in method of execution that they almost seem to be drawn by the same hand. And that is not the way to promote American national characteristics in architectural design.

On the other hand, the proportionate number of these French cookery designs is somewhat less than it has been in some similar collections of American architectural designs, and there are a good many examples of work showing vigour and freedom, and a desire to escape from mere precedent. In Mr. Wilson Eyre's slight coloured sketch of "First Section of the Free Museum of Science and Art" the attempt is made by avoidance of conventional detail, and a mere effective grouping of buildings in which a large circular block forms the principal feature; this is somewhat bald, but there is a wholesome simplicity about it. The design for the Saturday Club House, by Mr. D. K. Boyd (Philadelphia), is an ingenious attempt to combine a classic quasi-temple architecture with windows and gables freely introduced. The Wainwright Tomb in Belle Fontaine Cemetery, St. Louis, by Mr. L. H. Sullivan, a square mass with a plain dome over it, and with highly-wrought detail in its wrought-iron and bronze doors (we take it that the outer guard-doors are wrought-iron and the inner ones bronze), is a piece of really original design of great merit. The "Milwaukee Publishing Library," by Messrs. Ferry & Clas (Milwaukee) is, with the exception of the cupola, a piece of old standard Classic which looks more English than either French or American. The elevation of the Pawtucket Free Public Library, by Messrs. Cram, Wentworth, & Furguson (Boston), though there is not an original detail in it, is an original design, and a very pleasing and refined specimen of neo-Greek.

There are a good many more or less free and picturesque sketches for small country houses; Mr. Wilson Eyre is evidently the chartered libertine of the collection in this sense, and his designs are rather consciously original and defiant of precedent; but he is obviously a man of parts, and his sketches for domestic stained glass are also good. The elevation of the Lutheran Publication House, by Messrs. Miles Day and G. C. Baum, may be commended as a solid street front with a good deal of character; and there are some useful sheets of geometric drawings with detail sections scored over them, such as the "Houses at Tioga,"

by Mr. Seeler; "New Blind Museum," by Messrs. Cope & Stewardson, &c. The interior detail drawing of an Ingle Nook, by Messrs. Kennedy, Hays, & Kelsey, of irregular stonework with thick joints, and the direction, "masonry to be built up stone for stone from this drawing," is a piece of affectation of the constructed picturesque—an acted rusticity which defeats its own end.

The catalogue is, however, full of interesting matter, as a kind of brief epitome of some of the features and tendencies of contemporary American architecture.

NOTES.

The Decoration of St. Paul's.

AMONG the violent and exaggerated letters which have appeared recently in the daily papers, attacking Sir W. Richmond and his decorations at St. Paul's as if he were a person with no feelings and no position as an artist—some of them apparently written mainly with the object of advertising the writers—we are glad to single out that of Lord Windsor in Thursday's *Times*, which is a reasonable and thoughtful letter, and puts the case in a moderate and sensible manner. Lord Windsor simply asks for a pause in the work before going further, a consideration as to whether it is worth the price we are paying for it; and suggests that "the artist of to-day is wholly out of sympathy with the architect of the seventeenth century." If that is meant as a general statement we do not know that it is entirely true, for there is at present a good deal of sympathy among decorative artists with the architecture of the seventeenth century; if it is meant that the particular artist employed in this case is not in sympathy with Wren, we imagine it is true. Sir W. Richmond is, we think, making some serious mistakes in his recent work at St. Paul's, and we should like to see such mistakes avoided in the future, and as far as possible undone where they have already been made. But we are not on that account going to join in treating an eminent artist as if he were an ignoramus or an apprentice.

Railway Architecture.

ANY one who has gone along the line of the Great Central Railway from its terminus in Marylebone-road, through St. John's Wood, West Hampstead, &c., cannot but have been struck by the absolute ugliness of everything that has been done in the form of bridges, blow-holes, walls, fences, &c. We are struck by the contrast when we visit Germany, Austria, or even little Belgium, and find the care that has been taken everywhere to give the best appearance to engineering work. We may not admire Pomeranian brickwork as a style; we may not think majolica the best form of ornamentation; and we may not like to see ironwork treated in colour. But whatever the style may be, the new railway viaducts in Germany and Austria, whether they be in brickwork or iron, are becoming buildings of high constructional and artistic interest, showing what is intended in the construction in such a manner as to be agreeable to the eye. In Prussia station buildings will no doubt rank as the most typical architectural works of the last twenty years, probably even more so than the public offices which have been erected in some academic form of Italian Renaissance. The railings of a railway viaduct and the lamp posts on the bridges will figure as representative of the arts and crafts of the same period, whilst the constructional ironwork will show that a good and light engineering design may well embody that kind of beauty which is best expressed where the purpose of a construction is boldly shown. In London, on the contrary, everything that is associated with railway construction only speaks of that low standard of taste which pervades our utilitarian works.

Fire Protection in Hotels.

IT is one of the peculiarities of the Metropolis to boast of its infallibility the moment it hears of another city having been in distress. Instead of the New York Hotel fire having served as a warning to our hotel managers, they have hastened to impress upon the public, through interviews and otherwise, that the Windsor Hotel fire would be quite impossible with us. It is not our purpose to define which of our hotels are safe and which are dangerous, but it would, perhaps, be well to impress still more strongly on the London County Council that the average modern London hotel is not less dangerous, but more dangerous than the average modern hotel in New York, whilst the older buildings are no better. We have before observed that safety in hotels is primarily a question of plan, as far as life is concerned—a question of staircases, passages, lift-shafts, &c. This has already been recognised in several Continental cities, where the distance from any one room to the nearest staircase must not exceed 60 ft., where every block of fifty rooms must be divided by a party wall from the adjoining block, the corridors in each case being closed by substantial doors. Lift-shafts have to be surrounded by 9-in. brickwork; and fire-resisting doors, which close automatically, have to be provided at each floor level. Fire alarms, either automatic or otherwise, fire extinguishing apparatus, &c., have also to be provided; but by no means the same importance is attached to these as to the question of plan just mentioned. Such minor details as handrails on both sides of the staircases also call for consideration; and in one city it is considered necessary that every room, no matter where located, should have easy access to at least two staircases, one of which, however, may be a mere pass or service staircase. As far as construction is concerned, the fire resistance of the corridors and staircases is the point to which greatest importance is attached, whilst all staircases are often required to have windows to the open in order to facilitate ventilation.

Pearson's Fire Alarm System.

IN the *Thermostat* for March there is a description of the Pearson Fire Alarm System. In this system thermostats are fitted in all the rooms of a building, and whenever the temperature of any room rises above 120 deg. Fahrenheit a bell rings in the watchman's office and a Morse "tape machine" prints the number of the room in which the fire has started. The thermostats are usually fixed high up on the walls near a ventilator or window, so that the heated air may raise the temperature of the thermostats as early as possible on the outbreak of fire. Mr. Pearson seems to have been very successful in his arrangements for the prevention of the oxidisation of the mercury, so that there is no reason why his instrument should deteriorate with age The simple and effective method of testing the apparatus is also worthy of praise. The system can be usefully extended to whole districts. We understand that round Cripplegate many of the warehouses are connected with a station opposite the Fire Brigade Station. In the event of fire breaking out in any of the rooms connected with this station a bell rings, and the tape of the Morse machine prints a particular number. The attendant then opens a little metal drawer corresponding to this number and takes out a card with the address printed on it, which he sends across to the Fire Brigade Station. The address being known, the officer in charge knows exactly what hose, ladders, &c., he will require. The system seems to us a useful one, as it will sometimes give information of the outbreak of fires long before they would otherwise be discovered.

Metallic Cores in Mortar and Concrete.

THE results of an investigation by M. Considère to ascertain the value of metallic cores for strengthening mortar and concrete have recently been published in the "Comptes Rendus." It has been said that metallic cores can have very little strengthening effect upon the mortar, since the mortar cannot undergo an elongation of a tenth of a millimètre without breaking; but M. Considère has arrived at the conclusion that mortar armed with an iron core can undergo without rupture an elongation twenty times as great as would be possible without the aid of a core. Tests were made with various mortars and concretes, using prisms of square section 60 cm. long and 6 cm. in the side, in which were embedded rods or wires of iron. M. Considère is of opinion that injury to buildings by the settling of foundations, unequal expansions, and shocks is much less liable to occur when cores are used, and finds that wrought-iron and hard steel of the kind used for rails is capable of strengthening mortar and concrete to a much greater extent than is the iron usually employed for cores.

The Alternate Current Arc.

THE paper by Messrs. Duddell and Marchant describing "Experiments on Alternate Current Arcs," published in the *Journal* of the Institution of Electrical Engineers, is a very valuable contribution to our electrical knowledge. The problem which they have solved was to find out the effect of introducing an alternate current arc into an electrical circuit. In order to do this they solved the difficult problem of getting a simultaneous record of all the cycle of changes that take place in the current, the pressure across the carbons, and the pressure at the dynamo terminals in the hundredth part of a second. This was done by the help of instruments called "oscillographs," the mirrors on which respond instantaneously to the slightest change of pressure or current, and the rays of light reflected from the mirrors are all recorded on a rapidly moving photographic plate. They have obtained over a thousand photographs showing the instantaneous values of the cycles of the electrical quantities concerned in a great variety of important cases. The result is that, for testing purposes, we may now consider that the alternate current arc is a

known quantity. They have shown that there is no mystery about its action. They prove conclusively that M. Blondel was right in saying that it does not act like a choking coil, as there is absolutely no time lag between the current and the pressure at the carbons. It merely acts as a variable resistance. It is extraordinary that the explanation of the phenomena should, after all, be in accordance with the most simple and common sense electrical principles. Some of the experiments recorded, especially those with carbons cored with foreign substances, have an important bearing on present electrical practice, and may lead to new developments. The paper, which occupies over a hundred pages of the *Journal*, is well and clearly written, and we consider that the authors have proved the twenty propositions with which they conclude. It will be discussed with Mrs. Ayrton's paper at the meeting of the Institution next week.

Health Exhibition at Lincoln.

THE announcement of a special Health Exhibition at Lincoln in August (3rd to 19th), in connexion with the Annual Provincial Meeting of the Sanitary Inspectors' Association to be held in that city, may not be of any special interest to our readers generally, many of whom know by experience that one Health Exhibition is pretty much like another, and that it is rather unusual to come upon anything that is at once new and useful. But in regard to the locality the announcement is of some interest. The Eastern Counties are probably among the most backward portions of England in regard to sanitary knowledge and practice, and indeed it is mentioned in the circular sent to us that this will be the first exhibition of the kind ever held within the county of Lincoln. From that point of view the event is of some importance, and the results may be very beneficial. The exhibition, of which Mr. Henry Chaplin is President, will be held in the Drill Hall and the Old Grey Friars buildings. It is proposed to limit the exhibits to "such as seem to be distinctly useful and interesting." The sections are to be under the following heads: — *(a)* Ventilation, lighting, heating, cleaning, and smoke prevention; *(b)* water supply, plumbing, &c.; *(c)* drainage, removal and disposal of sewage; *(d)* materials, construction and decoration of dwellings; *(e)* foods and cooking, dairies, mineral waters, clothing and laundry; *(f)* disinfectants, disinfection and bacteriology; *(g)* hospitals, nursing and ambulance; *(h)* gymnastics, school-fittings, &c.; and *(j)* fire-engines and escapes, machinery in motion.*

St. Thomas the Apostle School Board.

A CORRESPONDENT draws our attention to the terms of the advertisement of the St. Thomas School Board for competition designs for a school to be built at St. Thomas (near Exeter), which appeared in our last two issues. Our correspondent (an architect) writes:—

"In the advertisement there is no date given by when the plans are to be in, nor is there any mention of the premiums, or if the architect whose plans are placed first is to carry out the work. No name is given of an assessor, nor is there any mention if the Board are going to employ one. One guinea is asked for the conditions. I was not going to present the Board with this amount without knowing the above, so I wrote sending my cheque and asking for the conditions on the understanding that if they were returned at once my cheque would be returned. The clerk returned my cheque and would not even give me the date when the plans had to be in by. How are we to know from the advertisement that the date fixed is possible to get the plans in by, or that the premium may not be 10s.?"

Our correspondent is perfectly right. Even in a case where more information is given the demand for the deposit of money for the conditions, as we have before pointed out, is unreasonable, as an architect can never known, before obtaining the conditions, whether they may not contain stipulations which would prevent him from competing. But to give a mere blank statement like this, that plans are invited, without stating even the general terms offered, and expect architects to put down a guinea to find them out, is perfectly absurd, and we hope no architects who respect themselves will apply for the conditions on those terms.

Huntingdon Grammar School.

THE Governors of this ancient foundation have resolved to celebrate the approaching tercentenary of Oliver Cromwell's birth by raising a fund for an enlargement of the school in which he had his education, before he proceeded, in 1616, to Sidney Sussex College, Cambridge. From an inquisition taken in 1570 it appears that St. John's Hospital, Huntingdon, was founded for the relief and maintenance of certain poor townsfolk and the support of a free grammar school. The hospital was established *temp.* Henry II., by David, Earl of Huntingdon (afterwards King of Scotland), who had married Maud, daughter and heir of Waldeof, Earl of Northumberland and Huntingdon (by his wife Judith, niece of William I.), and widow of Simon de St. Liz, Earl of Huntingdon and Northampton. In 26 Henry VIII. the hospital was valued at 9*l.* 4s. yearly (confer. Tanner's "Notitia Monastica"); in a return made in 1824 the net annual value of the charity is given as 520*l.* 2s. 6d., including 90*l.* for the school premises. The hospital buildings stood within All Saints' parish, and what is believed to have been the original chapel—opposite the east end of All Saints' church—has long served as the schoolhouse. The schoolmaster's house was rebuilt in 1561; about twenty-five years ago the schoolhouse was stripped of its shell, and restored by the late Dion Boucicault (in memory of his son) under Mr. Hutchinson's supervision. The roll of its more famous pupils includes the names of Professor Michael Foster, Samuel Pepys, and—in Dr. Beard's time—Oliver Cromwell. The last-named was born on April 25, 1599, in a house that had been built upon the site, and out of the materials, of the house of Augustine Friars founded, in St. John's parish, *temp.* Edward I. After the Suppression the Friary was granted to Thomas Ardern, and ultimately passing to the Cromwell family, became the property of Robert, father of the Protector. In May, 1631, just before removing to St. Ives, Oliver, with his widowed mother and his uncle, Sir Oliver, of Hinchingbrooke, sold the paternal estate in the town of Huntingdon for 1,800*l.*; the conveyance cites "all that capital messuage and tenements belonging to it called the Augustin Fryers." The house, built of stone, was pulled down shortly after the purchase of the property by James Rust in 1810. St. John's parish register contains the entry of Cromwell's baptism, the parish was united to that of All Saints in 1668, since which period All Saints' church, restored and re-roofed by the late Sir G. G. Scott, has served for the united parishes.

Herr Fritz Thaulow's Pictures.

A SMALL collection of the works of Herr Fritz Thaulow, the Norwegian painter, is on view at the Goupil Gallery. Herr Thaulow is a very clever mannerist with a broad style, his specialities being snow effects and water effects. In this exhibition there is one snow scene on a large scale, and remarkable for its realistic effect from the illusory point of view. From the artistic point of view we prefer such works as Dieppe Harbour and "A Side Canal, Venice;" in the latter the water is treated with great richness and transparency of effect. In "Village by Night" there is too much colour for real night effect; and there seems to be rather too strong a riot of red on the brick houses in "Washington Place," but it is at all events a bright effective work.

AN ENGLISH MUNICIPAL ENGINEER'S VISIT TO AMERICA.*

To arrive at a clear conception of municipal life and problems in America is no easy matter for a visitor from this side of the Atlantic—especially one who has been in close professional contact with municipal work in his own country—until he grasps as a central idea the important part which politics play in municipal affairs in the United States. Here, indeed, is to be found the essential point of view, the starting point from which the civic life of the Great Republic must be judged. What has been the effect of the political factor in the municipal life of America? To describe it as the curse of municipal government is not using language too strong. A victory at the polls, the mere turning of the political wheel, may be the signal for the discharge of admirable public servants, endowed with the best qualifications of the ideal municipal officer and animated with a lofty conception of his duties and responsibilities. Such an official may conceivably have been in office just long enough to enable him to learn the needs of his district and the best means of meeting them and of remedying defects, when some sudden political change deprives him of office, perhaps to see his place filled by a man whose sole claim to the position is based on adherence to the successful political ticket. Nor is this all. An official, no matter how admirable he may have been in the discharge of his duties, how much initiative he may have shown, or how great the public improvements he may have effected during his tenure of office, may ultimately be rewarded only by opprobrium and abuse if he should happen to be associated with the unpopular political party. . . . Such a state of affairs is to us so strange as to be scarcely conceivable, and is only cited as a significant illustration of the divergence in municipal government here and there. Naturally the effects of the system are sometimes disastrous in the extreme. . . .

New York may appropriately and conveniently be taken as typical of all other American cities, except—if the seeming paradox may be allowed—in those respects in which it may differ from them. The first characteristic that strikes the stranger is the block system on which the city is built, and the ease with which it may be traversed when once the central idea of locating oneself has been mastered. As some one has epigrammatically said, "Living in New York is like being a unit in a big sum in addition."

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* The Hon. Secretaries for the exhibition are Mr. R. A. MacBrair, the City Engineer, and Mr. W. H. Curtin, the Sanitary Inspector; Corporation Offices, Lincoln.

* A paper read before a meeting of the Incorporated Association of Municipal and County Engineers, held in London on January 20, by Mr. Geo. Livingstone, C.E., Surveyor to the Vestry of St. George, Hanover-square. We have omitted a few of the less important paragraphs here and there.

Broadway runs straight through the city from north to south, dividing it into east and west. All the avenues run parallel to it, while the streets cross it from east to west, so many houses constituting a block. Bearing this in mind, it is easy to calculate where 56 E. 24th-street or 177 W. 102nd-street may lie. All the avenues up to Fifth-avenue lie west of Broadway, then run up to Ninth-avenue on the east side. The system of numbering the streets has at least the negative merit of relieving the municipal authorities from the onus of naming them. The author's remaining remarks may, for the sake of clearness, be conveniently grouped under the following heads :—Traffic, paving, cleansing, dust removal, water supply, baths and wash-houses, public libraries, buildings, &c.

Traffic.

As the writer has already indicated, his remarks will refer particularly to New York, but will apply to American cities generally, of which New York may be taken as the type. Of America more than any country in the world, it may truly be said that time is money, and it may be taken for granted that no one walks any distance in America if he can possibly help it. Indeed, the national dislike to waste time and energy in walking has resulted in a wonderful example of supply following demand, for in spite of the multitude of surface cars, elevated railroads, tramways and ferries, new means of locomotion are ever being devised.

In New York the system of elevated railroads, which carry cars drawn by steam locomotives, now consists of four main double-track lines and a few short branches, all converging together at the southern extremity of the island in a terminal station. Two lines run on the east of Broadway and two on the west. Trains run at intervals of two minutes during the day and at intervals of seven to fifteen minutes from sunset to sunrise. Stations marked "up town" and "down town" are situated every five blocks in the "down town" or business district, and at intervals of half a mile apart in the "up town" portions of the city. The fare on all lines and for all distances is 5 cents, which is equivalent to 2½d. of our money, or, taking into consideration the relative values of the two moneys, is equal to about 1d. The noise and rumble of these cars is deafening and interminable. As the conductor's "All aboard !" penetrates to the streets below, and one whizzes past second-floor windows, one gets a glimpse of business houses and domestic interiors, and wonders how such an unsightly structure as an elevated railway was ever permitted to go down some of the principal streets of New York. Overlooking the railway are not only stores, warehouses, and offices in which business in carried on, but dwelling-houses. It may be questioned, however, if any of the occupiers and dwellers are acutely conscious of the fact of an elevated railway so close to them, so much are we the creatures of use and habit. It is strange, too, how the noise of New York, which to the stranger is at first one indistinguishable clamour, gradually detaches itself, as the ear gets accustomed to it, into separate and well-defined sounds. Whatever advantages the elevated railroad may possess as a means of lightening transit and of cheap locomotion, these are more than counterbalanced by its disadvantages as a dirt distributor and noise producer. Cinders, ashes, dust, and water silt down on to the roadway below, and the state of Third, Sixth, and Ninth Avenues would strike a London surveyor with dismay. Neither on this line nor on any other in America, with the exception of long-distance trains on the main lines, are there any class distinctions in connexion with the carriages, nor is there, as with us, any limit to the number of passengers carried. During the busy hours people crowd into the cars and hang on by the leather straps overhead until the cars are filled to suffocation, and an early morning train is a somewhat painful illustration of the equality of the sexes and of the principle of "every man for himself and the devil take the hindmost." Seated men and swaying women are rather the rule than the exception.

The tramways, or "street cars" as they are called in America, seem to do as large a business as the elevated cars. As they run through nearly every street and avenue, the city has almost been converted into a network of lines. The system of interchange tickets enables passengers, at a great saving of time and money, to go the whole length of the city, from north to south or from east to west, as the case may be, on one ticket and for one fare. The electric tram-car system is by no means confined to New York, but is the almost universal means of locomotion in the cities and towns of the United States. With the exception of New York, where the underground conduit system is adopted, all the tramway cars are run on the overhead trolly system. In Washington, Buffalo, Baltimore, and Philadelphia, for example, the latter system still prevails. It strikes one as a monopoly of the roadway, and has many other disadvantages. The chief advantage in the eyes of the promotors is its economy. It has been found from experience, the author believes, that the overhead wire system has a very injurious effect upon gas and water pipes. It is usual for companies introducing tram-cars to pay something by way of a tax to the municipal authorities for the privilege ; the amount varies in different cities according to circumstances. In Baltimore the municipal revenue from this source is so considerable that the authorities are able to defray the expense of maintaining their great public park, probably the largest and finest of its kind in the world. These electric tramways are certainly a saving in street wear and tear, to say nothing of the saving in trouble and expense in connexion with street cleaning. It is to be hoped that the progress they have made in America will become contagious, and that our great cities will rise to the occasion and emulate the enterprise across the water. In England, as every one knows, we are very much behind, though this state of affairs was no doubt very largely due to the Locomotives Acts. There is no need to point out how immense an advantage the extension of electric tramways would be in England. The author does not suppose they are ever likely to be popular in the centre and West End of London, but in the suburbs of the metropolis and in provincial towns and cities there is great scope for them, and the sooner people wake up to the fact the better.

Cabs, as a means of locomotion, play a very small part in New York City. No person ever dreams of taking a cab, except under circumstances which render it absolutely necessary. For one thing, the price is prohibitive, as the cabmen plying for hire seem to charge just what they please and the shortest distance cannot be accomplished under a dollar. There are rules and regulations governing the charges, but for some reason or other they are not enforced by the authorities. There is little reason, however, for using cabs, especially as there is an admirable system of baggage delivery, which enables a new arrival to despatch his baggage directly to his destination and follow it by rail or street car at a small cost. A few more words may be said about the general transit arrangements of the city. The outlying islands are connected by an admirable system of tramways and ferries. There are fourteen to Brooklyn City alone, and seven to Jersey—not counting the magnificent bridge as a means of approach. The bridge proper carries two drives, a broad free footwalk, a double-track railroad, and an electric loopline. Seats are scattered along the promenade and on the balconies of the towers where one may rest and enjoy the splendid view.

Although perhaps it may not be hoped for in the immediate future, the time will no doubt come when we shall be able to travel about, if not in trams, at all events in motor-'busses propelled by steam, electricity, or other form of mechanical traction. In America they do not seem to have made very much headway in connexion with motor cars, and this is perhaps due to the fact that there is not the same necessity for them as there would be if they had not so admirable an equipment of electric cars. The author only saw, and that in New York, one or two motor cars. They were of the most unsightly pattern, and reminded him of nothing so much as miniature steam rollers without funnels. He has, however, had the pleasure in New England of riding in a motor car, which was an ordinary American buggy driven by steam. This car had travelled a good many thousand miles, and was rather the worse for wear. The gentleman who drove it was the owner of the machine. He was in no sense a mechanic, and was quite a novice at the work, yet the machine was perfectly under his control. It can be driven backwards or forwards, or turned to the right or the left at any speed with the greatest ease, simply by a turn of the wrist guiding the lever. Its principal features were the boiler, and the gear and other mechanism, which were the invention of a very clever American mechanic. The author believes patent rights have been taken out both in Europe and America for this boiler, which can be adapted to almost any form of vehicle. He was very much impressed by the machine, for though driven by steam it made very little noise. If the vehicle, when it is perfected, as the author understands it is about to be, will only perform half as much as the inventor claims for it, there should be a great future for it in this and other countries. Of course, we all know that steam is the cheapest form of motive power, and it is stated that a machine working on the principle of this boiler will not cost more than ¼d. per mile. The tank from which the boiler is supplied has a holding capacity sufficient to take the car a distance of 50 miles, and enough oil can be carried to enable a distance of 100 miles to be covered. A motor car of this description will, no doubt, be introduced into this country at an early date.

In concluding this section of his remarks, the author may sum up by saying that, leaving motor cars for the present out of the question, the United States are *facile princeps* in developing what over there would be called "street transportation." This pre-eminence is no doubt chiefly due to the unique temperament of the American. This peculiar temperament, as compared with that of other nationalities, was well illustrated by General Collis on one occasion when (in a paper dealing with municipal problems) speaking of formalities that sometimes necessitate a wait of fifteen minutes on Parisian omnibus routes, he said, "To the Frenchman this is not a serious matter, whereas an American would chafe under it and perhaps go crazy."

Paving.

In 1895 New York had the unenviable reputation of being the worst paved city in the world. As has been already indicated, the transformation effected is due to the foresight and energy of General Collis, who introduced asphalt paving and brought about a marvellous improvement at a comparatively small cost. By means of asphalt, Fifth Avenue has been transformed into a delightfully smooth and noiseless thoroughfare, and Park-avenue—useless for a quarter of a century as a means of vehicular traffic—has been converted into a useful and pleasant roadway. The author may here mention a few of the chief differences between the professional practice in regard to street management prevailing in America, and that which obtains in England. In this country, as his readers are aware, the municipality repairs the footways, but in New York owners of property have to do it themselves, the municipal authorities merely calling upon them to affect the needful repairs. This procedure often leads to delay and evasion, the footway, meanwhile, remaining unrepaired. The system is also tolerably general in other cities, with the exception of Washington, where the householder defrays one-half the cost of repair, and the municipality the other. In spite of what was done by General Collis to improve New York in connexion with paving, street lighting, and sanitary matters, much still remains to be done. His exertions were confined chiefly to the residential part of the city and to the outskirts. Wherever the new pavements were laid they are undoubtedly excellent ; but many of the busy thoroughfares are in a shocking condition. The author yet ventures to question if there is in any city or town of any rank in Europe, a thoroughfare of the size and importance of Broadway in so deplorably defective a condition. The condition of the roadway and sidewalks of this and adjoining streets is a danger to man and beast. That such a state of affairs is tolerated in so practical and so advanced a community can only be explained by the fact that everything is subordinated to politics, and the municipal officers, as a rule, are merely pawns on the political chess-board. In New York, Baltimore, and Philadelphia the author saw many important residential streets and business thoroughfares in which neither roadway nor footway had been repaired for years. The fact that many of the streets are composed of worn cobble stones may possibly explain to some extent the American distaste for walking. All the more recent paving work is put down under contract, and maintained free of expense

for five years by the contractor. Subsequently they are maintained by the municipality usually in a slipshod way. For example, the author has seen streets in which openings had been made in connexion with gas or water mains, and had not been filled in for weeks, and even, in some cases, for months. Such cases, which would not be tolerated in London for forty-eight hours, are of common occurrence in American cities. Incidentally it may be mentioned that street refuges are unknown, and, naturally, crossing at the intersections of the busiest thoroughfares is no easy matter. Personally, the author found the policemen on duty at these crossings very civil and obliging, but he was told that this opinion is not shared by Americans themselves. In the suburbs of New York and other cities, when land changes hands for building purposes, the roads are at once laid out, paved and sewered by the city authorities at the expense of the abutting property owners. The object of this prompt action is to improve the property and prevent it from lying idle for any length of time, as the owner is rated for the land whether he builds upon it or not. It must be remembered, of course, that land in America is mostly freehold.

In regard to paving materials, the first thing noticed is the singular coincidence that, though wood paving was introduced into this country from America and has been so largely used here, not only in London but in provincial cities and towns, not a single yard of this form of pavement is now to be found in any cities the writer visited in the United States. The pavement of to-day and of the future in America is undoubtedly asphalt in one of two forms—either sheet asphalt, similar as regards surface to what we in this country know as asphalt, or asphalt blocks, both being composed for the most part of Trinidad asphalt. Trinidad Lake sheet asphalt calls for very little description. Asphalt block paving is composed of 90 per cent. of suitable pulverised stone and 10 per cent of steam refined Trinidad asphalt. The stone is heated to a high degree of temperature, and mixed with the requisite proportion of steam refined asphalt. The mixture in a heated state is subjected to immense pressure and melted into a homogeneous block. For street pavements the blocks are commonly laid 12 in. by 4 in. by 5 in., and weigh from 22 lb. to 24 lb., according to the specific gravity of the stone employed. It is claimed for both these forms of asphalt pavement that they offer the maximum amount of safe foothold for horses. No doubt smoothness of surface with safety of traffic are the features which chiefly commend them.

The City of Washington—the seat of Government and largely residential—possesses fine wide streets, and has the reputation of being the best-paved city in the United States. Here, as in most American cities, the paving consists of granite blocks, stone cobbles, sheet asphalt, and asphalt blocks. Wherever the two former are found, the streets are in a very bad condition. The footways are generally in keeping with the roadways, for they are composed of almost every conceivable kind of material—stone, concrete, brick, or asphalt—according to the fancy of the property owner, who is supposed to keep them in repair, except in case of complete renewal. In the latter case, the city shares the cost with the owner. Fortunately the great majority of the carriageways in Washington are paved with sheet asphalt and asphalt blocks. There are, in fact, about 300 miles of the former pavement and 200 of the latter. It is not the author's purpose to express an opinion as to the relative merits of these two forms of pavement, but he may mention that he was informed by Captain Beach, the Government Engineer officer of the city, that the asphalt blocks—many of which had been laid for ten or twelve years, and some even as long as fifteen years, and which were in excellent condition—had not cost one farthing to maintain, though laid on a foundation of gravel only. This pavement is now being extensively used in New York, Baltimore, Washington and many other cities. Samples of both the sheet and the block asphalt have been laid in London and Paris, and those who are interested in the matter can see lengths in King's-road, Chelsea, where Mr. T. W. E. Higgins, Surveyor to the Vestry, has laid a specimen of the former, and in Carlos-place, in the author's own parish, where he has laid 1,200 yards of the block asphalt paving. The author may add, however, that under no circumstances has he seen either of these pavements laid in any city in America under such conditions of traffic as those to which the busy London thoroughfares are subject. He can safely say that every surveyor and every Local Authority in this country would welcome any pavement that could be relied upon to be non-slippery, durable, and which had a smooth surface. At the same time it should be remembered that climatic conditions constitute important factors in connexion with the different forms of paving and their respective degrees of cleanliness. While speaking of Washington, it may be mentioned that there, as in New York, the electric tram-car is the chief means of locomotion, lines being laid even in the most fashionable thoroughfares. In another respect also, besides that of locomotion, American cities have a distinct advantage over our own. Generally speaking, they are better lighted—of course entirely by electricity. All things considered, the cost is rather less than with us. If the author has any adverse criticism to make in connexion with the method of lighting, it is that the clear globe in use in America is a mistake, as it tends to make the light of an unpleasantly glaring nature.

Street Cleaning.

In connexion with street cleaning in New York, the first consideration to be remembered is that the tramways and elevated cars largely diminish the traffic, while the comparative absence of the horse obviously tends to keep the main thoroughfares much cleaner and sweeter than they would otherwise be. It is well known that the cleansing of the New York streets was vastly improved by the late Colonel Waring, who, as Commissioner of Street Cleaning, was a colleague of General Collis, under the administration of Mayor Strong. The cleansing is done chiefly at night by means of horse sweepers, as with ourselves. Such cleansing as is required during the daytime is done by a method somewhat similar to our own; the main streets being placed under the charge of beatsmen or district roadmen, whose duty it is to keep a certain area cleansed. All the New York sweepers wear a uniform which in summer is made of white linen, and white helmets resembling the familiar pith helmets. This outfit naturally gives them a somewhat military and certainly distinctive appearance. The method adopted during the daytime is to collect the sweepings in bags, which are deposited at the street corners and there left until the "dump" carts call to collect the contents and take them to the depôt. The author is disposed to the opinion that, generally speaking, in the better paved streets of New York, the cleansing is superior to that of the London streets, but it should be remembered that this is no doubt largely due to the small amount of horse traffic. The streets there are not turned into stable-yards as in London, where the street traffic is practically all done by means of horses. It is a peculiar fact that in Paris horses create much less nuisance than in London; but the author is not prepared to say whether this is due to habit (method of feeding), or climate, or to a combination of these causes.

The author was informed that in the case of a fall of snow, the plan adopted is simply to make a track down the centre of the street, piling up the snow on each side. At intervals along this track gaps are cut to admit of foot passengers crossing from one side of the street to another, but in the event of a heavy snowfall no attempt whatever is made to remove the snow. Thus it would appear that in New York they have not solved the problem of snow removal any more than we have.

The recent death of Colonel Waring, from yellow fever, after his return from Havana, whither he had been sent to report on sanitary conditions with a view to devising a scheme of improvements, will be regretted by all who have come in contact with him or were familiar with the work he had accomplished. In 1857 he was drainage engineer of Central Park, New York City, and afterwards, like so many of his countrymen, he turned soldier during the continuance of the Civil War. Subsequently he carried on a general consulting practice in connexion with the sanitation of dwellings and institutions, but his name first became prominent in connexion with city sanitation and sewerage when, in 1878, to quote the words of an American paper, "he designed and constructed at Memphis, Jersey, the well-known 'separate system' of sewerage which has since been inseparably associated with his name, and which he introduced into various other American cities." But without doubt his greatest reputation, at all events so far as regards the general public, was gained in connexion with the work to which I have already referred. Those who wish to peruse a full record of the revolution effected by Colonel Waring in purifying a corrupt department and in devising systematic and business-like methods for securing the cleansing of the hitherto vile streets of the American metropolis, will find it set forth without ostentation in his remarkable book on "Street Cleaning and the Disposal of a City's Wastes." His death is a distinct loss to his country, but it is some satisfaction to know that the system of street-cleaning which he established still remains in force in the department which he put on so efficient a basis. It might, however, be held with some reason that the results obtained were due not so much to the system as to the manner in which it was carried out. The system remains, but whether it will continue to be carried out by Colonel Waring's successors with the same efficiency and conscientiousness as by himself has yet to be seen.

It is worth noting that street watering is conspicuous by its absence. What little is done is in the older thoroughfares, which are generally the busiest, the dirtiest, and worst paved, granite and cobble-stones being still the materials used. In the better paved streets there is practically no necessity for watering, as they are mostly of asphalt. Other factors in the case are the climate and the elimination of the horse, and the reduction of street traffic consequent on the extension of electric tramways and the elevated railway.

Dust Removal.

A few words may now be said on the vexed question of the disposal of house refuse. In New York each householder has to provide two movable receptacles, one to contain dust and ashes, and the other garbage. Every morning these are placed on the sidewalk in front of the house, and the effect can scarcely be said to enhance the beauty of the city's morning aspect. The authorities arrange for the removal of the contents under two contracts—one for the dust and the other for the garbage, the collections being made at the sweet will of the contractors. The contents, when collected by these conscientious gentlemen, are removed to depôts on the other side of the river, and the privilege of sorting them for the separation of such materials as are saleable is granted—chiefly to Italians. The residuum is then dumped in specially constructed barges and taken out to sea. Many of the residents in the better class neighbourhoods consider the system so objectionable that they make private contracts for the removal of dust and garbage rather than have the unsightly receptacles in front of their premises until it occurs to contractor number one to remove the dust, and contractor number two to remove the garbage.

In Washington the municipal authorities are in the unique position of not being responsible for the carrying out of this work. Each householder is obliged by law to get rid of his own dust and ashes, the authorities confining their efforts to the disposal of the garbage. How the work is accomplished the author has no knowledge, nor did he find any one to enlighten him on the point. When he ventured to express an opinion that the arrangement was open to grave objection, as dilatory people might neglect their obligations in regard to removal and so cause a nuisance to their neighbours, he was told that the medical officer of health was empowered to order the removal of the dust heap within a given time. In case of non-compliance the authorities would remove the dust and recover the expense from the defaulting occupiers. Whatever objection there may be to such a system from the point of view of advanced sanitation, there is no doubt that it is an ideally happy one in conducing to the peace of mind of the municipal officers, who are free from the possibility of complaints regarding the non-removal of dust. On the other hand, whether under such circumstances a conscientious medical officer can properly safeguard the health of the city is open to question. It can safely be said, therefore, that the dust problem is as far removed from solution among our go-ahead American cousins as it is among ourselves, and on the whole he is inclined to the opinion that our own methods for the collection, removal, and

disposal of house refuse are, in spite of the worry they cause officials, superior to the methods in vogue on the other side of the Atlantic.

Water Supply—Baths and Wash-houses.

The author does not think it is an exaggeration to say that the inhabitants of New York enjoy the finest water supply in the world. It is as free as air. A few details may be of interest to many readers. The main source of supply is the Croton River, and a group of lakes, some forty miles to the north. The water is conveyed by the Croton aqueduct, a conduit of brick and stone, completed in 1842, and able to deliver 96,000,000 gallons a day. An additional 16,000,000 gallons a day is derived from the Broux River. The Croton aqueduct crosses the Harlem River upon the viaduct known as High Bridge. In Central Park, four miles below High Bridge, is the retaining reservoir, capable of holding 1,030,000,000 gallons; and just below that is the receiving reservoir, which holds 150,000,000 gallons more. Besides these there are three "high service" reservoirs, one having a holding capacity of 11,000,000 gallons. The distributing mains have a total length of about 660 miles, and feed 8,420 fire hydrants, in addition to the private supply pipes. A new aqueduct for the provision of an increased supply has been in course of construction for several years past. The Croton watershed is also the source of the new supply, but new retaining reservoirs have been or will be built to store as much of the 400,000,000 gallons of water, now running to waste, as may be thought desirable. The new aqueduct is a tunnel 14 ft. in diameter and over thirty miles in length, carried through solid rock at an average depth of 500 ft. below the surface. It leads to the above-mentioned reservoir in Central Park. No addition will be necessary to the present system of distributing mains. When the system of storage reservoirs has been completed, the carrying capacity of the aqueduct will be 300,000,000 gallons daily. The Croton water is perfectly pure and wholesome, and New Yorkers show their appreciation of it in one way; for it is doubtful if the same amount of water per head is used in any other city in the world.

Public baths and wash-houses, as understood in England, are unknown in American cities, but the result of this practically unlimited water supply is that in every hotel and private house of any size there is a bath and water-closet attached to each bedroom. Whatever we in England may think of such an arrangement from a sanitary point of view, there can be no question as to its comfort. In passing, the author may express the opinion that in America they are ahead of us in all matters connected with plumbing, alike in regard to appearance, workmanship, and details. Hot, cold, or shower baths can be obtained at any of the large hairdressers' shops for twenty-five cents, inclusive of soap and towels. In New York there are cheap salt swimming-baths along each of the rivers, and along the East River front some free baths for the poor are maintained by the city. Many Russian, Turkish, and medicated baths are to be found, and some of the cheaper ones are kept open all night.

The difference between London and New York in regard to the provision of public baths suggests a few general reflections. While these establishments are no doubt very useful and meet a great want in England, the author is not quite sure that they always benefit the class for whom they are chiefly intended, namely, the artisan and working-class. His own view, and the one that he would like to see put into practice, is that every working-man's house should be provided with a bath, which, in his opinion, is from a sanitary point of view, almost as essential as a water-closet. When the London artisan reaches home in the evening, more or less tired, the nearest public bath is probably some considerable distance away, and in these circumstances there is very little inducement for him to take advantage of the facilities provided. In addition, the price is often prohibitive. In many cases the public baths are closed on the only day, namely Sunday, on which the artisan has sufficient time at his disposal to avail himself of the luxury of a bath. In the author's opinion, it is infinitely more desirable that the working-man should have the privilege of a bath for himself, his wife and his family in the privacy of his own home.

General Sanitation.

New York, built as it is on a long narrow island, enjoys an unrivalled geographical position in regard to the disposal of sewage. There is a good system of drainage, and every householder has to pay a fee of $9 for making a connexion with the main sewer, in addition to the cost of laying the drain to the line of building. In Baltimore, on the other hand, a prosperous business city, with a population of 600,000 inhabitants, there is no sewerage system in any proper sense of the term. There are some cesspools, and the drainage has to find an outlet as it best can. Undoubtedly there is in many parts of America a fine field for sanitary engineers. It seems strange to the visitor when he finds that there are no public conveniences in America. Two were constructed in New York under the administration of General Collis, but they had not been opened at the time of the author's visit. On making inquiries he found that the absence of public conveniences is not so serious a disadvantage as it at first sight appears. Every man has free access to the rear of saloons and hairdressers' shops, and it is a general custom for well-dressed men to go into the big hotels and use them just as if they were residents. Ample accommodation is provided for women in all stores, hotels, &c. As no complaints are heard, the existing arrangements would seem to give satisfaction, but there is something free and easy about them that would not commend itself to our more conventional ideas.

Buildings and Elevators.

The great height of the buildings in New York necessitates an almost universal use of lifts, but to such a pitch of excellence have they been brought that it is really of little consequence how high the buildings are. "Express" elevators are found in every public building, and in consequence it makes little difference whether a man carries on his business on the third floor or on the thirteenth. These elevators ascend and descend with a swiftness unknown in this country. Indeed, until one becomes accustomed to it the sensation produced is very similar to incipient seasickness. In New York there are many extremely handsome buildings, built of brick and of various kinds of stone found in the vicinity, marble being lavishly used as a medium of decoration. The bricks used for building purposes are extremely beautiful and varied in colour, a result which is attributed to the fact that they are burnt with wood instead of dust and ashes as in England. The regulations in regard to building operations in America are very different from those which prevail in England. Here, as we are all aware, the builder has to enclose the site with a close boarded fence or hoarding, and is also bound to provide a properly constructed and suitable temporary footway and handrail for the safety and convenience of the general public. But in New York and most of the other American cities the builder is allowed the whole of the footway and a third of the roadway for the purpose of his building operations, and he is by no means backward in availing himself of his privileges, for he will deposit his plant and materials without taking any protective measures in the interests of the community unless perhaps the placing of lights at night. Such a state of affairs can scarcely fail to be a source of danger in connexion with vehicular traffic. At all events it is certainly an unsightly method of working, and an exceedingly inconvenient one for the general public. Before leaving the subject of buildings the author may remind his readers that while the great height of the "sky scrapers" makes these erections very unsightly, they are the outcome of the needs of the community. New York being an island, its area is necessarily circumscribed, and hence arises the virtual impossibility of avoiding high buildings.

Libraries.

Nearly every city in the United States has its public library, more or less magnificent. As a rule it is the gift of some wealthy, generous, and philanthropic citizen. New York—or indeed any other city in the United States with the exception of Boston and Cincinnati—has no public library in our sense of the phrase, that is to say, an institution maintained out of the rates. What is known as the New York Public Library consists of the Astor, Lenox, and Tilden foundations, under a board of trustees, but the quarters are inadequate pending the erection of a suitable building by the city authorities. There are, of course, libraries accessible to students, but as they either belong to private individuals or are in connexion with some institute, their use is limited by various restrictions. The Astor Library was founded by the will of John Jacob Astor, who died in 1848, leaving $400,000 for the purpose. His son, William B. Astor, added $550,000 to the endowment, and his son, John Jacob Astor, gave some $700,000 more. Among the best class of students and scientific men this is the most popular consulting library in the city. It is open from 9 a.m. to 6 p.m., and is used by some 75,000 readers annually.

The Cooper Institute has a library and reading-room, and is patronised by a somewhat different class of readers, as the library consists largely of books of an extremely practical nature. Its opening in the evening is a decided advantage to readers of the artisan class. The library possesses a complete set of the old and new Patent Reports, which are consulted annually by some 2,000 inquirers. Upwards of 460 newspapers are taken in, and in the evening the tables are thronged with men and boys.

Some mention, however imperfect, should be made of the magnificent Library of Congress in Washington. All that America could provide in the way of art and skilled craftsmanship was enlisted for the adornment of this superb building. The library grounds adjoin the Capitol, and cover an area of 10 acres, equivalent to three city blocks. The outer walls have a frontage upon four streets, and this, combined with the spacious courts and nearly 2,000 windows, makes the library one of the best lighted in the world. Apart from the wonderful sculptures and wall paintings, which are symbolical of the whole field of human knowledge and culture, the building is unquestionably the handsomest of its kind in the world.

Railway Travelling.

A few notes on some points not included under any of the preceding heads will bring me to the end of this brief record of my impressions. Englishmen, when visiting the States for the first time, cannot fail to institute a comparison between railway travelling there and in England. Having heard so much from Americans, and read so much as to the superiority of the American system, and the magnificence of the cars, the author had perhaps formed rather exaggerated notions, but he must confess that his experience was somewhat disappointing. On the lines on which he had occasion to travel he did not find much superiority either in comfort or elegance to what we have at home. There are no distinctions of class, and the sleeping cars, frankly speaking, are detestable. On some lines it is possible to have a parlour car by paying an extra fee. The Pullman cars are in no way superior to those in England, if indeed they are so good. The trains, as a rule, are overrun by boys shrieking out the latest news or the respective merits of candy, matches, or chewing-gum, and the noise of these precocious pedlars and the incessant passing to and fro of the passengers add a fatiguing element to the irksomeness of the long journey necessary to visit most of the big cities in the States. A distinctive feature of American trains, and one with which we are unfamiliar in this country, is the cow-catcher attached to the front of the train for the purpose of removing obstacles from the line. To an Englishman there is a feeling of strangeness in seeing trains running through the streets of large towns. In Syracuse, for example, the "Empire" express dashes through one of the main streets. No protection whatever is afforded to the shops and footways on each side. There are no raised platforms, and a large bell is fixed to the engine. Certainly the arrangement seems a somewhat dangerous one, but there are apparently not many accidents. "I guess," said an American friend, "the kids and things have grown to know." Possibly this is the explanation.

Parks.

The Americans are justly proud of their fine public parks, and they are, as a rule, charmingly laid out and well maintained. They are not directly under the supervision of the municipal authorities, but are maintained by a board of specially appointed commissioners, who are chosen by the mayor. The commission are also entrusted with the laying out and improvement of the streets and drives adjoining the annexed district. The park police, who are clothed in grey uniform and

are on duty in all the parks and public squares, are under the control of the commission, and are quite distinct from the blue-coated city force. The latter, indeed, regard themselves as a somewhat superior order, and have bestowed on the despised park police the disdainful title of "sparrow chasers." The Central Park, New York City, contains a fine zoological collection, a meteorological observatory, and many beautiful driving tracks.

Telephone Service.

In the United States the telephone as a means of communication has been brought to great perfection. The telephone system in New York is probably the best in the world. There is no delay, the number is switched on at once, and one can make an appointment or ask a man to dinner within five minutes of application. This the author proved by personal experience. As the usual record is something like 30,000 calls a day, it has been found convenient to divide the city into numerous districts, each with a central office; but at frequent and convenient intervals one finds located in telegraph and messenger offices, hotels, drug stores, or ferries, branch offices known as "pay stations," in which the use of a telephone can be had for a small fee. A blue ticket is displayed to indicate the location of one of these stations. Some of them are known as "long distance" stations, in which communication can be had with places as distant as Chicago. Most of the private houses have a telephone connexion as well as "call buttons" for police, fire brigade, and for district messengers. Allowing for the difference in money values the charges in New York are more moderate than those prevailing in London. This fact, combined with the great convenience afforded, brings the use of the telephone within the reach of practically every householder. Excellent systems are found in other American cities, and the rates are even cheaper than in New York. In England not a few municipal authorities, including the London County Council, are anxious to add a telephone service to their already numerous responsibilities, while many people, with greater reason, advocate that the entire undertaking, like the telegraph and postal services, should be controlled by the State. If the present service, which is carried on under considerable difficulties, were organised with anything like the completeness of the American system, the agitation against it would probably not have assumed such serious dimensions.

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Conclusion.

For those who are interested in municipal matters there is plenty to observe and study in American cities, and a visit will repay the time, trouble, and money expended. If a perusal of this paper should induce any brother municipal engineers or other readers to take the trip, its preparation will be justified. The whole journey can be made in a month, and still allow of some sixteen or seventeen days being spent in the States. The trip is not a particularly expensive one, though the cost of living in America would seem to the author to be somewhat greater than here. From his own experience the author came to the conclusion that the dollar was about equal to our shilling in purchasing value. Any visitor who has the advantage, as the author had, of a general letter of introduction from the American Minister, which he obtained through the kindness of Colonel Sir Howard Vincent, C.B., M.P., will find himself provided with a passport sufficient to ensure the heartiest reception from every one, including public officials and others whom it is a pleasure to meet. Personally, the author received the greatest kindness and hospitality from all, and had the *entrée* to the best clubs in New York and Baltimore. The well-to-do American is a genial companion and a charming host, and one could wish to meet no more agreeable men than the gentlemen whom it was the author's privilege to know on the other side of the water.

NEW THEATRE OF VARIETIES, HASTINGS.—The Empire Palace of Varieties, Hastings, has just been completed and opened. Messrs. Ernest Runtz & Co. were the architects, Mr. P. Jenkins was the contractor, and Messrs. Doulton & Co. supplied the terra-cotta. The site is that of the old Marine Hotel, with some of the adjoining property. The theatre has a frontage of 130 ft., and a depth of 70 ft. Accommodation is provided for an audience of 1,500, with promenade and lounge space for 500 more.

NOTES IN BRUGES.

THE occasional visitor to Bruges notes from interval to interval a continued activity in building operations. At the present time they are chiefly devoted to restoration work; though, to tell the truth, the line of distinction between "restoration" and rebuilding is sometimes hard to find. Works of this class, however, were amply noticed some time back in these columns, and it need merely be mentioned in passing, as an evidence of good will and public spirit on the part of the authorities, that the town subsidises private undertakings of this kind, provided they are carried out on traditional lines.

A like regard for ancient precedent inspires, broadly speaking, the design of new erections, which have been, during late years, both many and important. Apart from some unfortunate ventures along the modernised ramparts (a modernisation which nothing can compensate for), and here and there within the town, these new works are consistently designed in old Flemish style. A great railway station, a large County Council house and post-office, a vast hospital, an extensive training college, with a number of lesser and private buildings, have been carried out in this spirit. In no city of the same size, probably, and in the same space of time, has so much been done in one uniform style. Such activity quite belies the popular notion of a city in decline.

Those, however, who are jealous of the architectural traditions of Bruges will note in this interesting Mediæval movement, and among much praiseworthy and excellent work, a certain excess of zeal, a fault of over-embellishment, a straining after effect, and a consequent restlessness. The plainer buildings are invariably the best. Moreover, in Gothic palaces traceried, crocketted, and pinnacled, one scarcely recognises the work-a-day purpose which most of them are meant to serve. Now if there is here a certain departure from propriety, there is also, we think, a wandering from local precedent. Let us instance, in witness, the great Mediæval hospital of St. John. Standing in the shadow of the likewise early and austere Church of Notre Dame, it is a model (however impaired) of breadth, of simplicity, and of repose. Enrichment is sparingly introduced, and is always carefully focussed. The whole pile bespeaks a practical purpose. Again, the vanished "Waterhalle" (like the railway station, a purely utilitarian building) is known to us by old views as a vast unbroken fabric of absolutely simple outline. And, after all, an impressive simplicity is perhaps the highest reach of art. Rich and sumptuous edifices undoubtedly there were of yore, and the bygone Brugians loved especially to crown their dwellings with light, fantastic turrets. But how artfully were these elegancies contrived to contrast with the massive bulk and relatively plain forms of the main building. We need only name the "House of Seven Turrets" and that of the "Orientals," as they existed in their completeness, to make good this point.

In the many Mediæval buildings still standing, in the ample pictorial records of those which have unhappily perished, and in the admirable Museum of Antiquities developed of late, the present-day architect and craftsman have to hand exceptional means for carrying on their remarkable revival with faithfulness and intelligence.

MAGAZINES AND REVIEWS.

THE *Art Journal* contains an illustrated article by Mr. Radford on the works of Mr. Elihu Vedder, the American artist of whom we hear a great deal at present, and some of whose designs are to be on view at Messrs. Dowdeswell's next week. Mr. Vedder is an artist who has apparently been a good deal influenced by Blake—as to spirit though not as to manner; there is a great deal of poetic and mystic suggestion in his designs; it is possible that their serious feeling has led to their being considered more remarkable than they would be on the mere ground of power of design. The number also contains an article on the Italian sculptor Francesco Jerace, whose "Beethoven" and "Germanicus" are far too melodramatic (after the tendency of modern Italian sculpture); his bust of Madame Vigée-Lebrun, and his chimney-piece at the Meuricoffre Salon at Naples are, however, very charming and delicate work.

The "Easter Annual" of the *Art Journal* is devoted to the work of William Morris, and is in itself a very interesting collection of decorative designs; the essay, written by Mr. Lewis F. Day, is, while thoroughly sympathetic, moderate in its tone, and recognises Morris's limitations.

The *Studio* (March 15) devotes an illustrated article to the works of M. La Touche, the French painter, who has no doubt made a style of his own, but whose importance is we think a little overrated by contemporary critics. As Dr. Johnson comprehensively said, "nothing odd will last long." A collection of his works will be on view in London next week, at the Fine Art Society's Galleries, so the article (perhaps intentionally) comes apropos. The illustrations of Mr. Baillie Scott's designs for the decoration and furniture of the Palace at Darmstadt are very interesting.

Among the articles in the *Engineering Magazine* we find "Electric Traction in Great Britain" and "The Merits and Permanence of the Masonry Arched Bridge," by Mr. Albert W. Buel, an article which gives welcome evidence of the beginning of a reaction in favour of solid-built bridges. As the author says, "no bridge of modern times surpasses the Pont du Gard in beauty and grandeur, and it is a safe prediction that it will remain a monument to its builders long after our great modern steel bridges have turned to dust."

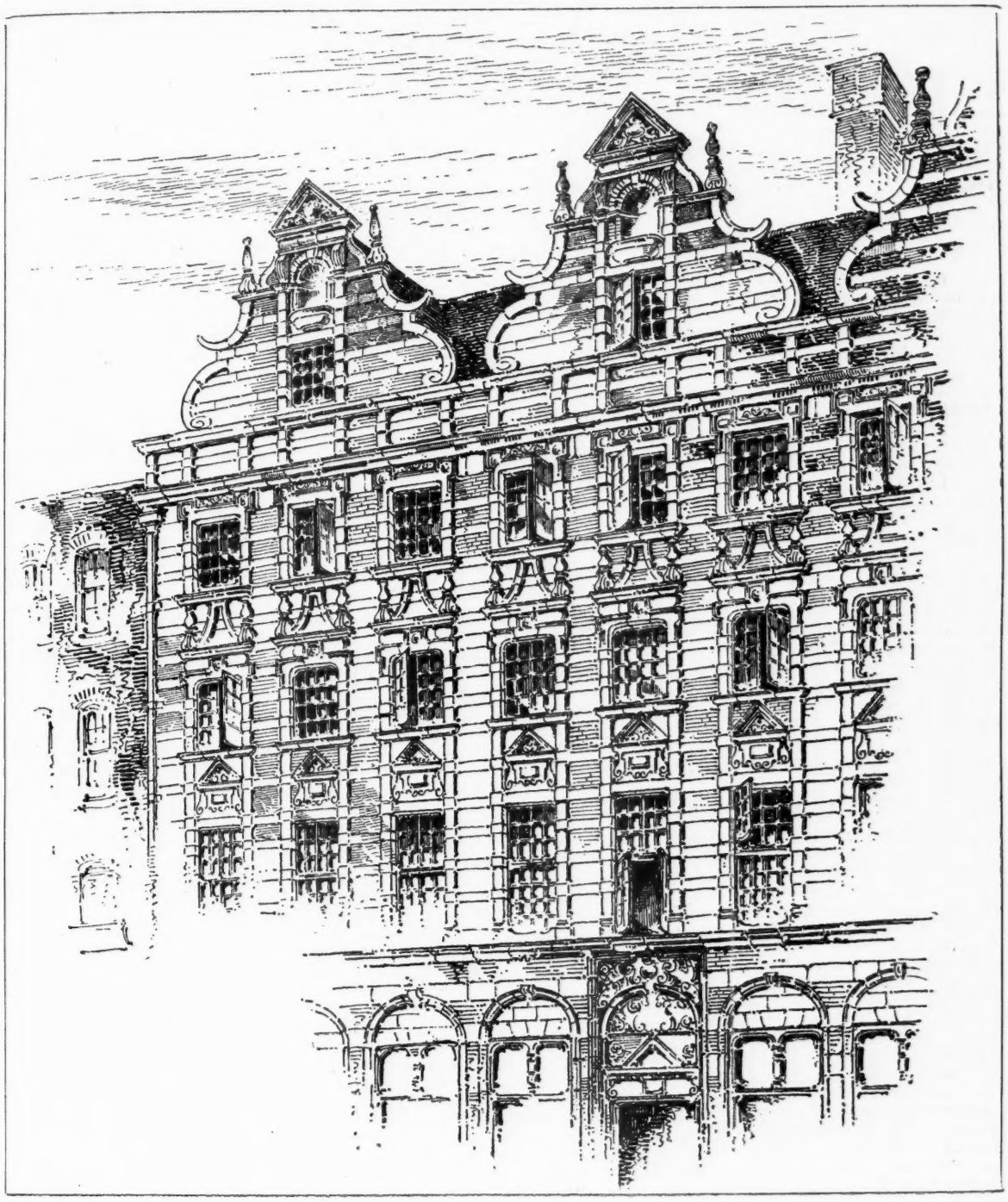
The *Technology Review*, of which the first number reaches us, is apparently a periodical started in connexion with the Massachusetts Institute of Technology. It contains an article on "The Function of the Laboratory," and one, with plans and photographic illustrations, of the new Pierce building in connexion with the Institute, which may be of interest to our readers. The remainder of the issue is occupied by news of special relation to the Institute and its members.

To the *Contemporary* Dr. Collins contributes a criticism on the London Government Bill, which is naturally written from the point of view of the London County Council, but we are inclined to think he is right in most of his criticism. His argument is either that the Act would give to the new Corporations the name and outward show of municipal dignity without its powers; or that powers worth exercising can only be given them at the cost of the breaking up and disuniting of authority in London. "The disintegration of the growing unity of London into a conglomerate of sham municipalities under the hegemony of Greater Westminster, though it may enliven and embellish local government in the Metropolis, can scarcely fail to raise the rates, while it will postpone indefinitely that unity, simplicity and equality of treatment which are the cardinal principles of the reformation of London."

In the *Fortnightly* Mr. Samuel Howe ("of New York") writes an attack on the decorative work going on at St. Paul's which contains some truth coupled with a great deal of exaggeration and an apparent determination to find fault with everything done by Sir W. Richmond, who, though we think he is making some serious mistakes, has a claim to be treated with more respect than this; nor do we know what are the claims of Mr. Howe of New York to sit in judgment upon him.

In the *Westminster Review* Mr. H. G. Reeve writes a very short article on a very large question—no less than "What is Art?" The article is really a criticism on Tolstoi, who has lately propounded the view that art has nothing to do with enjoyment; that its only business is to find out what is right and recommend it to mankind. That was Carlyle's view also. Mr. Reeve takes the saner view that the object of art is to please rather than to teach, and supports it by the example of Shakespeare—sufficient in itself.

In the *Century* is a short article of some interest on "American Discoveries at Corinth," by Mr. Richardson, the Director of the American School at Athens. The Director rejoices that the American School, starting with no knowledge of the locality of any object mentioned by Pausanias, have discovered in the past year the theatre, and in the second year the fountain of Pirene, of which illustrations are given. There can, we think, be no reasonable doubt of the reality of the find, and the American School may be congratulated. The number includes an article by M. Tissot, the painter, entitled "Round about Jerusalem," with sketches of typical heads; and one on "Abso-



Sketches of London Street Architecture. XXXI.—Business Premises, Wigmore-street. Messrs. Ernest George & Peto, Architects.

lute Zero (liquid air)" by Mr. W. Clark Peckham.

Harper contains the second instalment of Mr. Russell Sturgis's admirable essay on "The Equipment of the Modern City House." This article deals mainly with the accessories in a house—closets and cupboards, stairs, lifts, gas-pipes, and electric conduits. It ought to receive the attention of architects, as it not only throws light on the way things are done in the States, but contains a great deal of really useful and sensible suggestion on minor practical matters.

The *Pall Mall Magazine* contains an article on Kensington Palace, with some good illustrations of the interior, and one on "The Queen's Furniture at Windsor," showing some very fine examples of French and English Renaissance furniture, though the illustrations are not on a large enough scale to be of value to artists.

The *Genealogical Magazine* contains an article by Mr. J. Gale Pedrick on the seals of the Diocese of Bath and Wells, pointing out the interest attaching to the subject, from the fact that for ten centuries the employment of seals to authenticate their proceedings has been continuous among English Church dignitaries. There are, it appears, no less than ten seals, having different significations, in official use in connexion with this diocese, which are described. It is a pity we could not also have had illustrations of them.

In the *Antiquary* Miss (or Mrs.) Isabel Robson writes an article on embroidery under the heading "England's Oldest Handicrafts;" and Miss H. A. Heaton traces out the antique history and development of the myth of St. George and the Dragon, with some illustrations; the article leads us into a curious field of antiquarian research.

In *Knowledge*, Mr. Grenville A. J. Cole, Professor of Geology in the Royal College of Science for Ireland, is writing a series of articles on "Secrets of the Earth's Crust," the second of which appears this month.

The *Quarry* includes an article on "The New Sanitary Law in France as Applied to Contractors and Builders," which will be of some interest to those connected with building work in England.

THE INSTITUTE OF BUILDERS (INCORPORATED).—Mr. Joseph Randall (of Messrs. Kirk & Randall, Woolwich) has been elected President of this Institute for the ensuing year.

HIBERNIAN BANK PREMISES, DUBLIN. — New premises intended for the North City branch of the Hibernian Bank are in course of erection in Dorset-street, Dublin. The premises are being erected by Mr. Kevin Toole, from plans prepared by Mr. W. H. Byrne, both of Dublin.

LONDON STREET ARCHITECTURE.—No. XXXI

THE illustration represents Messrs. Daniell's business premises in Wigmore-street. It shows a flat front depending for effect on three gables and on the contrast of the materials employed, which are red brick and buff terra-cotta; the latter is used in bands and cornices and for the pediments and architraves of the windows. The roof is covered with red tiles. Messrs. Ernest George & Peto are the architects.

INSTITUTE OF BRITISH DECORATORS.

THE recently-incorporated Institute of British Decorators held their first annual general meeting at Painters' Hall, Little Trinity-lane, E.C., on the 23rd ult. Members from all parts of Great Britain and Ireland attended this meeting, the primary object of which was to formally elect the General Council, in which is vested the management of the business and affairs of the Institute.

Mr. J. D. Crace, of London, was duly elected President of the Institute; Messrs. Thomas Bonnar (Edinburgh), George G. Laidler (Newcastle), Alexander G. White (Liverpool), J. C. M. Vaughan (Hereford), Robert J. Bennett (Glasgow), and Henry Gibson (Dublin), were ap-

pointed Vice-Presidents of the Institute; and Messrs. William Allon (South Shields), William Brown (Dundee), Charles Carlton (Glasgow), James Clark (Edinburgh), M. Cowtan Cowtan (London), M. E. Dockrell (Dublin), Isaac H. Donaldson (London), David Laing (London), John McIntyre (Dublin), Thomas Preston (Burnley), John Ratcliffe (Bolton), John Scott (Glasgow), James Sibthorpe (Dublin), John Smith (Sheffield), William G. Sutherland (Manchester), John Taylor (Birmingham), and John Whyte (Aberdeen), were appointed members of the General Council.

Mr. I. Hunter Donaldson, the present Master of the Company of Painter-Stainers, in whose hall the Institute have their headquarters for the time being, at the opening of the proceedings addressed in the name of the Painters' Company a few words of welcome to the members of the Institute.

Mr. J. D. Crace, the President, then addressed the meeting as to the progress made by the Institute since the meeting of the Provisional Council in February last, and it was stated that 174 decorators had become members of the Institute, and that in addition upwards of sixty applications for membership had been received by the secretary and would be brought up for consideration and election at the meeting of the General Council, to be held at the close of the annual general meeting.

Several matters of interest were brought to the notice of the meeting by the President, including the question of the admission of women, if duly qualified, as members of the Institute; and it was the general opinion of the meeting that, if qualified, they ought to be admitted. A further question of sub-dividing the Institute into a larger number of districts than at present was also considered, but it was thought that further inquiry should be made, and reports were invited from the various local Associations.

The President then invited the members present to express their views as to the expediency of compelling applicants for admission as members of the Institute to submit to an examination before being admitted to membership, and pointed out that, in his opinion, to insist upon such a test would be to kill the Institute at the very start; for it was obvious that men who had been in business for many years and who were of established reputation would not submit themselves to examination as a condition of admittance to an Institute only in its infancy. The President further stated that all applications for admission to membership of the Institute would have to come before the General Council for election, and every applicant would have to be nominated by two existing Fellows of the Institute, and that every care would be taken both by the General Council and by the Fellows nominating that no unsuitable persons should be elected; and that, at any rate for the present, this should afford the Institute a sufficient protection against the admission of unsuitable members.

Several members present expressed themselves as of this view.

At a meeting of the General Council which was subsequently held new members were elected to the number of fifty-six, of whom forty-four were elected as Fellows and twelve as Associates. Several of the leading decorators in London have applied for admission to the Institute since the meeting was held.

Books.

English Cathedrals. Illustrated. By FRANCIS BOND, M.A., F.G.S., Hon. A.R.I.B.A. London: George Newnes, Limited.

WE are sorry this book has been written. It is evidently intended to be a popular handbook; and its airy, conversational style and positiveness of assertion admirably fit it for such a purpose. But there was no necessity at the present time for the production of another popular book on the English Cathedrals, while the author's original theories and criticisms, interesting and suggestive as many of them are, must be subjected to a good deal of examination and discussion before they can properly find a place in such a work. Had Mr. Bond done himself and others justice by giving in greater detail his reasons for setting aside generally accepted opinions, his book might not have been a popular one, but it might have been a valuable contribution to an interesting study; he would at least have given us a chance of agreeing with him; and, in any case, of respecting his views. As it is, we can but hope, for the sake of those he so lightly undertakes to instruct, that they will examine his opinions more carefully than he himself appears to have done. Mr. Bond tells us, in his introduction, that in his chronology he has "relied rather on architectural than on documentary evidence," a system which, if we remember rightly, he defended lately at the Institute. But, as was then pointed out, the architectural evidence must rest primarily on the documentary, and, though the latter may often be open to suspicion, especially if it was not contemporary with the work it professes to describe, neither is the former a perfectly reliable guide, as is shown by the early Perpendicular work at Gloucester, in the case of which even Mr. Bond is obliged to accept the documentary evidence, though it flatly contradicts what, without it, would be taken as the conclusive evidence of the architecture. The book is well illustrated by small photographic views, but there are no plans of the buildings. The author is good enough to refer readers to the "valuable plans, on a large scale," published by the *Builder*, a recommendation for which we are duly grateful; but if it was worth while to publish the book at all, surely a series of ground plans was a *sine quâ non*.

Beverley Minster: An Illustrated Account of its History and Fabric. By CHARLES HIATT. London: George Bell & Sons.

ALTHOUGH Beverley Minster does not rank as a cathedral, Messrs. Bell's series could not have been considered complete without a volume devoted to this building. It must be classed with the cathedrals architecturally, and from an architectural standpoint is, indeed, far more worthy of the title than some of the "glorified parish churches" which have been raised to that rank in this century. Excepting the colour of the binding, which is a pleasant blue instead of a rather crude green, this book is in every respect uniform with the volumes on the cathedrals, and is written by the author of that on Chester, who, justifiably, displays a good deal more enthusiasm for his present subject than for the former one. Possibly some of his eulogies may seem to those of cooler judgment a little overdone; but in presence of the structure admiration is apt to assert itself above criticism. The unity of design, the fine sense of loftiness, the masculine vigour of the choir, and the grace of the flowing tracery in the nave windows and of the late west towers, are all exceptional, if not unique, and rarely fail to appeal even to those who are least sensitive to beauty of form. Professor Freeman has severely criticised the form of the vaulting, the transverse ribs of which are of compound curvature, and the west gable, which he calls a sham. But the authority of these criticisms is tainted by the fact that he wrote them at a time when all three and four centred arches were condemned as a matter of course, and every deviation in design from what was held to be—sometimes on very insufficient grounds—the logical treatment of construction was called a sham. The curious makeshift design of the piers of the eastern transept are an admitted blot on the architecture of the minster; and they and the masonry above the western arch of that transept at one time led to some controversy. But Mr. Bilson has satisfactorily shown that the masonry in question is the commencement of a lantern over the crossing, abandoned after it had been commenced. One wonders how it could ever have been supposed that the four massive piers were designed with any other object than the support of a lantern. Mr. Bilson finds a simple and reasonable explanation of their peculiar form in supposing them to have been originally designed symmetrically, but altered in execution to give greater width to the high transept arches, and to avoid encroaching on the floor space of the sanctuary. The only difficulty this leaves is in the fact that the piers return to their normal section a few feet from the summit. Is it not more likely that the piers were actually built as designed, and that it was only after some of the arches had been turned, and the lantern commenced, that the narrow proportions of the openings to the transept and the encroachment on the sanctuary were recognised as a mistake, that the piers were then pared down and altered, and, as a consequence of this reduction of their strength, the lantern was abandoned? This volume is better illustrated, so far as the number, scale, and choice of the illustrations goes, than most of those of the cathedral series, and particularly than the earlier volumes. But the plan is a very poor one, and the views are rather indistinct.

The Cornish See and Cathedral. Historical and Architectural Notes. Published by the authority of the Dean and Chapter of Truro. Truro: Heard & Sons; London: Hamilton, Adams, & Co.

THIS book cannot be said to have the interest for architects that its title might lead one to expect, and that a writer competent to describe and criticise our only nineteenth-century cathedral would have given it. Frankly, the subject is treated in the manner of the average local guide-book which delights chiefly in recording the names of benefactors, the value of their gifts and their subscriptions to this fund and that, the names of the "polished" marbles used in the pavements and fittings, lists of the monuments, the subjects represented in the sculpture and stained glass, the gold and silver vessels, and so forth. Descriptions of the architecture are short and confused for want of knowledge of the necessary terms, and criticism resolves itself mainly into repetitions of "handsome," "elegant," and similar non-committal adjectives. It is certainly recorded in one place that Mr. Pearson "was selected as architect," and in another that he "was instructed to prepare designs for the various internal fittings;" but his name is mentioned with less appreciation than is accorded to that of the clerk of the works, and as if it were of no particular importance who supplied the brains for the undertaking. It is to be supposed that the details with which the book deals interest a good many people, since a second edition has been called for; but to us it seems that one of the main subjects, the cathedral itself, is treated without any sign that the writer or those who commissioned the book have the slightest appreciation of its fine character and unique position among modern architectural works.

The Testing of Materials of Construction. By WILLIAM CAWTHORNE UNWIN, F.R.S., M.Inst.C.E. Second Edition. London: Longmans, Green, & Co. 1899.

IN the *Builder* for June 9, 1888, we reviewed at some length the first edition of this book, and are glad to see that a second edition of such a useful work has been called for. This new edition, while retaining the same general arrangement as before, has been brought very thoroughly up to date. Many records of recent tests have been added, and new testing machinery described.

In the introduction, the author shows how much more useful information may be obtained from accurate tests of the materials used than from experiments on the completed structure, because no load can, in practice, be applied likely to injure the work unless it has been very badly proportioned or constructed. We often hear that such and such a steel and concrete floor, for instance, has safely carried a load of so many cwts. per square foot. Information like this is of very little value, as it fails to show what factor of safety there is. But accurate tests of the component parts, combined with good design and careful inspection, will tell us at once what loads may be applied with any margin of safety that circumstances require. From this book we find out what tests should be made, how to make them, and what results we may expect from previous experiments.

Chapters I. to III. deal with the mechanical properties of bodies acted on by stresses, the plasticity and hardness of materials, and with stress-strain diagrams. The various kinds of testing machines used, and the methods of holding test-pieces in them are very fully described in Chapters IV. and V.; measuring instruments in Chapters VI. and VII. Chapter VIII. is an interesting and useful one, as it describes the preparation of test-pieces of various metals and the tests that are or should be applied to them. Chapter IX. deals with elastic constants for metals.

The remaining seven chapters, or 200 out of the 450 pages in the book, contain a mass of information as to actual tests that have been made of metals, timbers, stones, bricks, limes, and cements; the results being tabulated and

reduced to common units. This latter part alone makes the book of the greatest use to all engaged in constructional work.

As this work is one that will be principally used for reference, we should have liked to see a fuller index. While, for example, eighteen pages are devoted to timbers and twenty-eight to stones and bricks, and tests of many varieties of these materials are given; the index, apart from the general references to timber, stone, and brick, only refers specially to one kind of timber, and to granite only among the stones. This, however, detracts little from what is probably the most valuable book on tests of materials of construction we have.

Practical Dictionary of Electrical Engineering and Chemistry in German, English and Spanish; Treating especially of Modern Machine Industry, the Foundry and Metallurgy. By PAUL HEYNE, assisted by Dr. E. SANCHEZ-ROSAL. Dresden: Published by Gerhard Kühtmann. London: H. Grevel & Co.

THE present development of the electrical and allied industries in Spain and the many States of Central and South America which speak Spanish has created a demand for a dictionary of technical terms. This volume will supply this gap and we can heartily recommend it. To many engineers and contractors as well as scientists it will prove very useful. It contains many words in everyday use by foreign engineers which also appear in foreign technical journals and yet are not to be found in any of the ordinary dictionaries. There are very few omissions, the only important one we noticed was "braze." "Tachometer" is not given but we suppose the hideous word "speedometer" stands for this. Again "infinite" in Spanish is surely "infinito" and not "infinitesimal," which means the exact opposite. It is possible that the Spanish workman mixes up the two. A note to this effect would have been welcome.

A drawback to this dictionary is the occasional use of very doubtful English; although the meaning is nearly always clear, it would have been an improvement if the authors had got an Englishman to revise the proofs. Idioms are often translated directly from the German, as, for example, "from midst to midst" is given as the translation of "von mitte zu mitte," instead of from centre to centre. Borum and phosphor, the German forms, are used instead of boron and phosphorus, the "lecture" of an instrument instead of the "reading," infinit for infinite, apparatuses for apparatus, &c. "Salt of sea" and "salt of petre" sound strange to English ears. We have also noticed the following amusing translations made apparently with the help of a somewhat antiquated dictionary—"water of holy," "salt of bitter purging," and "sensible paper" instead of "distilled water," "sulphate of magnesia" (Epsom salts), and "sensitive paper."

Small Accumulators: How Made and Used. The "Model Engineer" Series, No. 1. Edited by PERCIVAL MARSHALL, A.I.Mech.E. London: Dawbarn & Ward.

THIS little book on small accumulators will prove a practical guide to amateurs and students who desire a useful knowledge both of their theory and construction. Those accumulators are now used for so many purposes, such as lighting carriage and cycle lamps, working induction coils for medical and photographic purposes, working motors, &c., that there ought to be a large demand for this trustworthy handbook. If the subsequent books of this series bear out the promise of the first, these sixpenny handbooks will prove most helpful to the class for whom they have been written.

The Manufacture of Varnishes; Oil-Crushing, Refining, and Boiling, and Kindred Industries. Translated from the French of Ach. Livache. Greatly extended and adapted to English practice by JOHN GEDDES MCINTOSH. Published by Scott, Greenwood, & Co., London. 1899.

THE publication of this book is evidence of the fact that a new era has commenced in the industrial history of varnish manufacture. Scientific men have long been engaged upon the investigation of the resins, gums, and oils; and, although much yet remains to be discovered the joint results of their researches and of the experiences of men long familiar with commercial varnishes and their constituents have rendered possible the production of the present work, which, while remaining thoroughly practical, discusses at considerable length the chemical properties of the various varnish constituents, and the reactions which occur when they are mixed and used in the form of varnish.

The preparation of varnishes by blind adherence to ancient recipes is an expiring industry, and in future varnish manufacture will be governed by the laws of science and the results of chemical research, as are so many other large industries.

The first portion of the book describes the numerous resins, their behaviour under the action of different solvents, and their physical properties. Section 2 deals with the colouring matters employed in the production of coloured varnishes; and section 3 with alcohol, spirits of turpentine, and other solvents. Sections 4, 5, and 6 describe the cleaning and crushing of resins, the effects of heat upon resin, and the plant and processes used in preparing spirit varnishes; while section 7 discusses oil crushing and refining, and section 8 the manufacture of oil varnishes.

Recipes for all descriptions of varnish are given, together with much useful information regarding their manufacture; but a feature of the book which is especially worthy of notice is the attention which has been devoted to adulterants, and the methods by which they may be detected. Architects in general seldom have samples of oil or varnish chemically examined, and we believe that they by no means fully appreciate the extent to which adulteration is carried on.

The book is clearly printed, and contains a fairly satisfactory index; it will form a very useful work of reference, not only for varnish manufacturers, but for all concerned in the use of varnishes and drying oils.

The Evolution of the Steam Locomotive. By G. A. SEKON. London: The Railway Publishing Company, Limited. 1899.

THIS is a popular history of the steam railway locomotive as developed in Great Britain. The author has obtained his information from reliable sources, and has produced a book which is eminently readable. He starts with Trevithick's engine, built in 1803, which seems to have been the first that was a practical success, as it hauled five loaded trucks and seventy passengers a distance of nine miles in about four hours. From this we are introduced, in succession, to almost every type of locomotive that has been used in this country down to engines only just built, so that very interesting comparisons can be made.

The book is very fully illustrated, some one hundred and fifty types being shown. Unfortunately it is printed on glazed paper, which not only has caused both letterpress and illustrations to be somewhat "smudgy," but makes it very trying to the eyes to read.

We are sorry to see that the author uses such words as "scientist" and "location," which, whatever language they may belong to, are certainly not English.

The Internal Wiring of Buildings. By H. M. LEAF, A.M.Inst.C.E. Westminster: Archibald Constable & Co. 1899.

THIS book can be recommended to architects and others who possess an elementary knowledge of electricity as it contains a clear and simple account of the modern methods of wiring buildings and yet does not pass over those difficulties like calculating the sizes of cables which often give so much needless labour and worry to the uninitiated. The various systems now used for enclosing cables, wood-casing, metal tubes, concentric conductors, &c., and the general arrangement of the switches and cut-outs in use with these systems are well described, and there is a great deal of interesting information which will be found very useful in practice. The chapter on costs and estimates is well done, and the figures can be commended as giving a very fair idea of the cost of wiring at the present time. An appendix gives the Phœnix Fire Office rules, and the rules of the Institution of Electrical Engineers. The rules of the Westminster Supply Corporation are also given as a sample of the rules of supply companies.

BOOKS RECEIVED.

THE TESTING STATION OF THE BRITISH FIRE PREVENTION COMMITTEE. (Published by the Committee.)

THE ART OF REPOUSSÉ. By Gawthorp. (B. T. Batsford.)

SPON'S ARCHITECTS AND BUILDERS' PRICE-BOOK, 1899. By W. Young. (E. & F. N. Spon.)

HISTORIC MAP OF BATH. (*Bath Chronicle* Office.)

THE BUILDING TRADE DISPUTE.

ON the 30th ult. Mr. J. A. S. Hassall, the Secretary of the National Association of Master Builders, forwarded a letter to Mr. M. Deller, the General Secretary of the Plasterers' Union, in which he stated that his committee were satisfied with the assurance given by the union that beyond claiming the right and privilege to persuade any plasterer working at the trade to join their organisation they had no desire to coerce foremen who did not actually use the plasterers' tools into joining their ranks as ordinary members. Mr. Hassall further added that, although the officials of the Plasterers' Society had not communicated to the Masters' Association their proposals for a settlement of the dispute, the employers had agreed to meet the union in conference, and he proposed that twelve men representing the union should be appointed to meet twelve members of the National Association of Master Builders at the London offices on April 6.

The difficulty in regard to foremen being compelled to join the union as ordinary members having now been removed, the chief points to be settled between the masters and men are: (1) The union's practice of "blacklisting" certain firms; (2) The refusal to work with non-unionists; (3) the limitation of apprentices; and (4) the refusal of the men to accept the decision of the employers as to which workmen shall do certain work in cases of dispute.

At Birmingham, on the 3rd inst., a meeting was held of all the branches of the building trade, except the masons, in England and Scotland, to consider the plasterers' dispute. Four hundred thousand men were represented. The proceedings were private, but it was understood that the discussion turned chiefly upon the course of action to be taken at the conference with the employers. Though not conceding plenary powers to the delegates who will attend to settle, such authority was given as was thought would lead to a settlement. A hope was expressed that reason would be brought to bear upon the deliberations.

On Wednesday both the Plasterers' Union and the Masters' Association held meetings, at which the final arrangements for the conference were discussed.

The employers are to be represented by Messrs. W. Holdsworth (Huddersfield), R. Neil (Manchester), T. F. Rider (London), B. J. Greenwood (London), J. Bowen (Birmingham), W. Symonds (Cardiff), W. Lowry (Newcastle-on-Tyne), W. Nicholson (Leeds), J. Higson (Manchester), W. Blake (Plymouth), John Rule (Sunderland), and G. Nichols (Leicester).

The Union will send its President (Mr. Mark Jones), the general secretary (Mr. M. Deller), and delegates from Cardiff, Birmingham, Bristol, London, Leeds, Liverpool, Manchester, Newcastle-on-Tyne, and Nottingham.

We are informed, just as we go to press that the masters broke up the conference, as the representatives of the men refused to forego the right of coercion.

POST-OFFICE, WISHAW. — New Post-office buildings are in course of erection at Hill-street, Wishaw. The architect is Mr. Alex. Cullen, Motherwell. The various contractors are:—Masonry, Messrs. Loudon & Inglis, Cleland; joinery, Messrs. D. & W. Nimmo, Wishaw; plumber, J. Waterson, Wishaw; slater and plasterer, Mr. Wm. Black, Wishaw.

BATHS, ROTHERHAM.—On the 29th ult. a new swimming bath, provided by the Rotherham Corporation in Market-street, was opened. Mr. W. Eckersley, a local engineer, was engaged to prepare a scheme, and it has now been carried out, at a cost approaching 5,000*l*. The bath is the largest in the district, measuring 26 yds. by 12 yds., and has a depth ranging from 5 ft. 8 in. to 3 ft. 8 in. There are fifty dressing boxes. Mr. Richard Snell, of Rotherham, has been the contractor for the building; Mr. Johnson, of Tinsley, has supplied the tubes and girders; and Messrs. Newton, Chambers, & Co. (Limited), Thorncliffe, have been responsible for the ironwork for the roof.—*Sheffield Telegraph.*

Illustrations.

BEVERLEY MINSTER: TOWERS AND WROUGHT-IRON SCREEN.

THESE drawings are a portion of those for which their author, Mr. Hervey Rutherford, was awarded the Pugin Studentship this year. Mr. Rutherford sends us the following comments on the work:—

"The sketch shows the western towers of Beverley Minster from the north-east. They are built of Tadcaster stone, as is the rest of this magnificent pile, and form one of the finest examples of their kind in England. Their slender proportions at once attract the eye, and coming direct to Beverley from York, where one had been accustomed to the vastly different proportions of the western towers there, one had some difficulty in appreciating those of Beverley to the full extent at first.

The Queen's Diamond Jubilee, which is responsible for so many of our buildings now in progress, has not been allowed to pass here without evidence, which one regrets to say does not tend to enhance Beverley Minster. They are at present busily engaged in filling the niches of the western towers with statuary at something like an average of 20*l.* for each group, so one can imagine what the effect of such statuary must be on towers such as these.

The wrought-iron screen is situated in the north aisle of the choir and is of very good workmanship. There has been another screen in the south aisle of a slightly different and, I think, inferior design, but that is now relegated to the lumber portion of Beverley Minster."

DESIGNS FOR CHAPELS AND CREMATORIUM, NOTTINGHAM.

IN this design, which was exhibited at the Royal Academy of last year, the authors, Messrs. Nicholson & Corlette, have placed the Anglican and Nonconformist chapels at opposite sides of the crematorium, each being separated from it by a carriage-way.

By this method service might be read in either chapel without interference with the other, and the cortège could then pass on to the cemetery. If the body was to be cremated it could be carried to the chapel first and then to the crematorium hall after service, or else direct to the hall. The coffin was to be lowered as into a grave by passing it by a lift through the floor of the cremating chamber on to the bearers which carried it direct to the furnace in the basement. Provision was made in the hall for the disposal of the cremated bodies similar to the methods adopted by those who used this custom among the Romans. The cloisters and waiting-rooms were arranged separately for the use of those attending either chapel, so that the wings should protect the open ambulatories. The aspect selected for these was to the south, so as to make the general arrangement as cheerful and comfortable as possible. The flue for the furnaces was treated as an angle feature in the design of the central and bell tower, which was used also as a means of ventilation for the whole scheme, access to the upper stage being provided by a turret staircase on the south-east corner of the central group. The attendants and engineer's offices were placed immediately at the rear of the cremating chamber.

The design obtained the second premium in the competition in which it was submitted.

ROBINSON MEMORIAL TOWER.

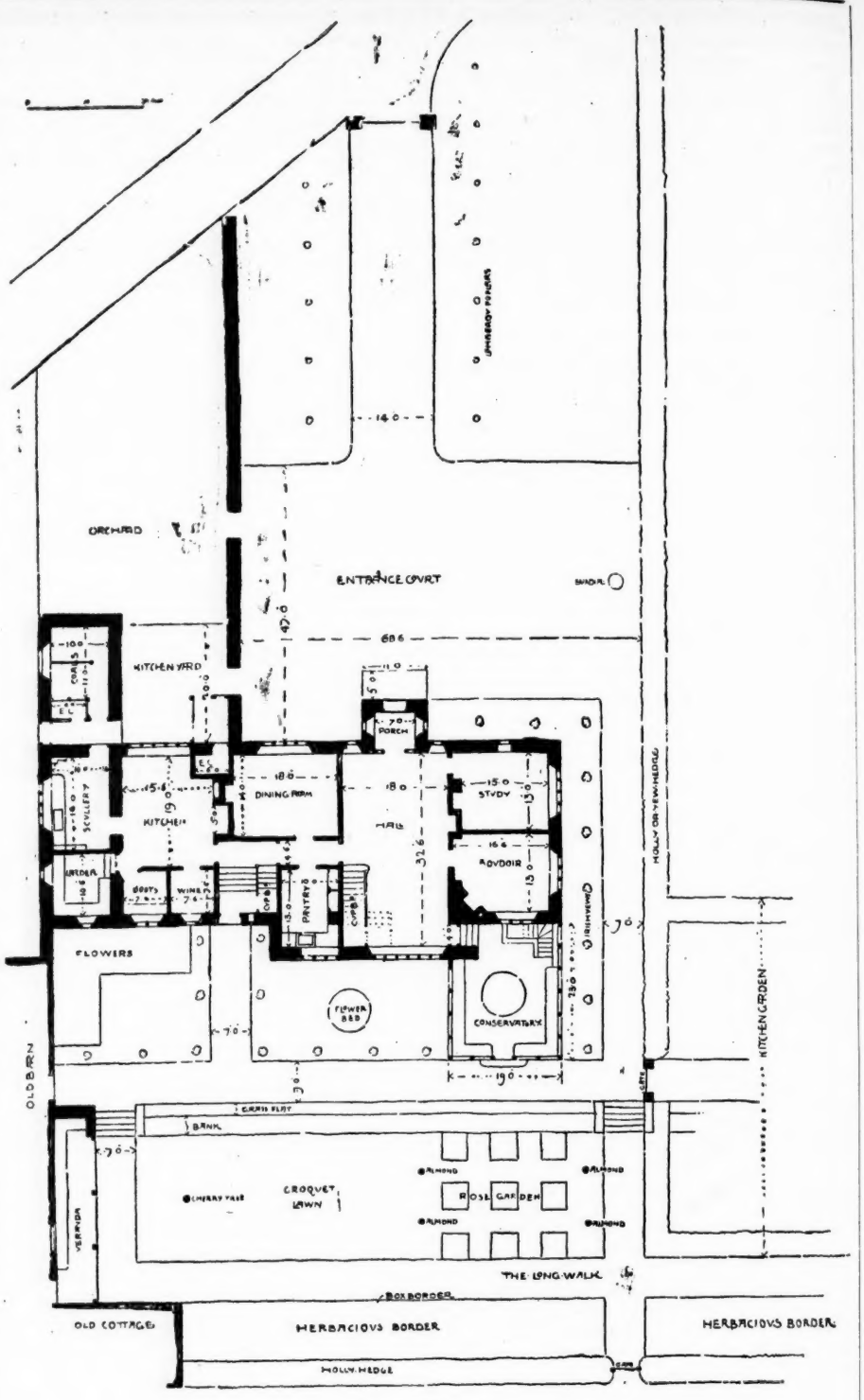
THIS tower was built as a memorial to the late Alfred Robinson, M.A., for many years Fellow and Bursar of New College, to whom the present size and prosperity of the College is very largely due. The College at the same time completed the adjoining College buildings to the east, a portion of which had been built some thirteen years earlier.

The material is Clipsham stone. The contractors were Messrs. Benfield & Loxley; the carver, Mr. Bridgeman, of Lichfield. The memorial figure is by Signor Lucchesi.

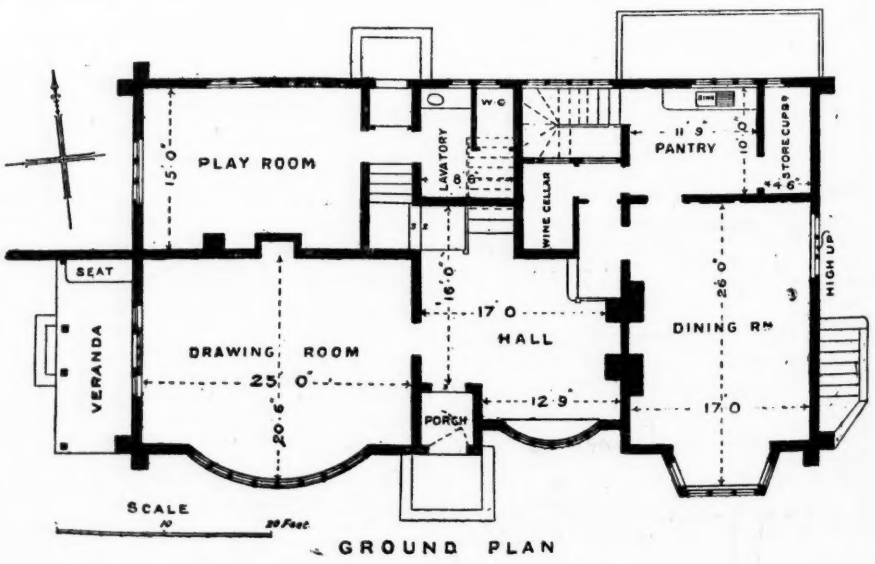
The architect is Mr. Basil Champneys, and Mr. W. Simpson acted as clerk of works. The drawing was exhibited at the Royal Academy of last year.

HOUSES; THORPE MANDEVILLE AND LIMPSFIELD.

OF these two houses, designed by Mr. Voysey, that for a site at Limpsfield, though



House at Thorpe Mandeville. Plan.



House for a site at Limpsfield. Plan.

planned for a special situation and for a client who was about to build, owing to various circumstances has not so far been proceeded with.

The house at Thorpe Mandeville is now being carried out, the contractors being Messrs. W. H. & T. Hawkins of Brackley. The exterior materials are brick and cement roughcast. The contract price was 2,190*l.*

DESIGNS FOR WALL-PAPERS AND TEXTILES.

THESE designs, by Mr. C. F. A. Voysey described generally on the plate as designs for wall-papers, were not in fact all designed with that object, one or two of them having been designed for textiles. The following are Mr. Voysey's explanatory notes on them :—

"No. 1. This design was made for wall-paper or woven silk, but never considered good enough by the manufacturers to be produced.

No. 2 has been produced in silk and wool by Messrs. Alex. Moxon & Co. with great taste.

No. 3 was designed for wall-paper, and is printed by Messrs. Essex & Co.

No. 4 was designed for a wall-paper, and is printed by Messrs. Essex & Co. It has also been produced in tapestry by Messrs. Alex. Moxon, but with the substitution of an evil-looking harp for the V.R.

No. 5 was designed for fabric but never executed. It is supposed to symbolise purity, being a sort of lily and a sort of vulture, the last-named useful scavenger of battlefields.

No. 6 has been executed as a carpet by Messrs. Tomkinson & Adam.

No. 7 is a design for a wall-paper, being a drop pattern, each tree being placed in diamond form so that all bands or lines are avoided."

Correspondence.

To the Editor of THE BUILDER.

THE CRYPT AT HEXHAM.

SIR,—Thanks to the *Builder* and that careful, able, and accurate authority, Mr. C. C. Hodges, of Hexham, we are at last supplied with an accurate and understandable plan of the Abbey Church and the singular vaults below; plans which, when backed by the letterpress, fairly seem to point out that the crypts there found (and at Ripon) are neither of

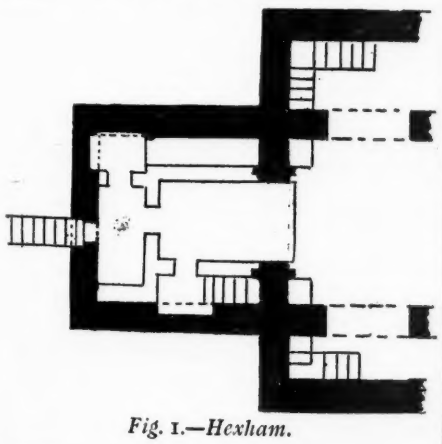


Fig. 1.—*Hexham.*

Wilfrid's period nor would have been assigned to him had it not been for the fashionable excitement imported even into the consideration of dry architectural questions.

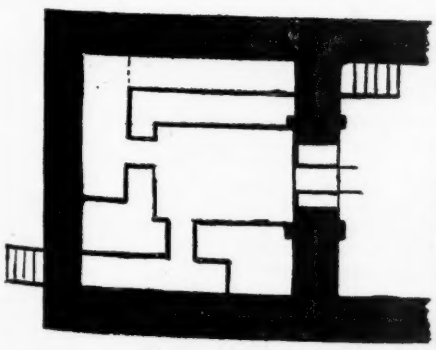


Fig. 2.—*Ripon.*

The Hexham and Ripon crypts (figs. 1 and 2) appear to be merely the transference of the plan of such vaults under choirs (fig. 3) sent westwards to parts there covered by stone structures, with the

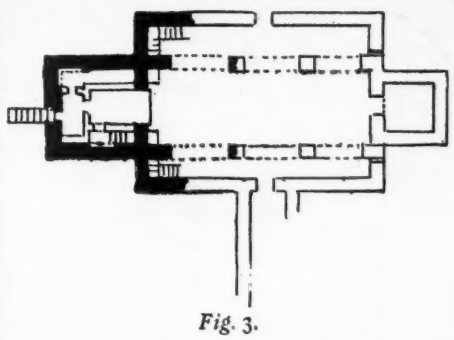


Fig. 3.

priest's house of less durable materials still further west again. It thus seems probable that these two cases are actually of very late date, if allowed to be of Saxon parentage. That of Ripon is situated under the west tower of an aisleless church, that of Hexham under the west tower of one which then received a north chantry aisle, a very narrow south one being then added also for access to the stairs of descent on that side. The review of the historical evidence given in the letterpress much assists such view. It attributes the church to Wilfrid, about 679; states that it became the seat of a bishop's See in 681 (Wilfrid then preaching in Sussex) and "so remained until 821, when, no doubt owing to the Scandinavian inroads, it was allowed to lapse" (*i.e.*, 140 years). Wilfrid visited Ripon and Hexham in 706, and, after a stormy life, died in 709. His monastery at Oundle (of wood) was so thoroughly burnt at the time of his death as left no place for his body during the night to be placed in.

Hexham, we are told, "maintained its monastic character until its overthrow under Halfdane, the Dane, in 875; it then remained in a ruinous condition, and was practically abandoned by its priest until 1083." Northumbrian history may fairly suggest hope of an earlier date, about 1043 (or thereabout). Much faith is required to accept Wilfrid's work as unchanged during the first 140 years. But the call is excessive which demands preservation during the abandonment from 875 to even about 1043; a special 168 of miraculous providence years at least. It is not, therefore, strange if Prior Richard's account may possibly be of that which he saw in his time, but certainly could not be of work earlier than 1040. He himself is stated to have died in 1175, 466 years after Wilfrid's death and 300 years after its ruin by Halfdane.

Mr. Hodges would make a most valuable contribution to the history of architectural art in Northumbria if he would describe and illustrate the many stones found about the church during its late maltreatment, thus throwing light on the history of its changes, even be they several hundred years later than Wilfrid's death in 709. J. T. IRVINE.

SIR,—Mr. Hodges is mistaken in saying that the crypt at Hexham was "a place of refuge and resort where religious rites could be carried on in times of danger, and also, perhaps, as a place of sepulture for those held in special veneration." If he will compare his own admirable plan and section with the plan and section of the crypt under the west end of the ruined basilica at Pompeii, given in Lange's "Haus and Halle" (Leipzig, 1885) he will see that the crypt at Hexham is almost an exact copy of that under the basilica.

The crypt at Hexham was originally under the west end of a Roman basilica. The two staircases at Hexham correspond exactly to the two staircases at Pompeii, and are in the same position. Both crypts have a mysterious hole in the roof. The crypt at Pompeii has a "cellar window" in its west wall. So had the crypt at Hexham, for the steps on the west side, shown in Mr. Hodges' plan, led down to the old "cellar window" of the Roman basilica.

All this is consistent with ancient chronicles, which speak of Hexham as having been the most splendid basilica on this side of the Alps.

The crypts at Hexham, Ripon, Repton, and everywhere else, were connected with the business of the law courts, as I have shown in my recent book on "The Evolution of the English House."

S. O. ADDY.

WOODEN WATER-PIPES.

SIR,—I observed at the Marble Arch the other day some old wooden water-pipes being unearthed. I happened last autumn to meet an engineer who, if I rightly understood him, said he had been taking up in some district in London quite recently similar wooden pipes, which, I gathered, had been in use up to the time of his substituting iron pipes for them. Are any of these still in use, and can you say at what date they may have been laid and by what water company, and is it commonly known by what process they were bored and fitted? Those I saw to-day were apparently spiggotted one into the other. It is to be presumed that they are not so ancient but that the manner in which they were made is known; also how the connexions with them were made and whether they were subjected to any process of seasoning or induration?

LEONARD REDMAYNE.

STRENGTH OF STEEL GIRDERS

SIR,—Will some reader of the *Builder* kindly inform me of the best formula (modern) for calculating strengths of steel girders and joists?

G. F. LAKE.

The Student's Column.

ARCHITECTURAL HYGIENE:

XIII.—WATER SUPPLY AND POLLUTION.

WE may consider this subject under the following headings :—

1. *Sources.*
2. *Physical properties.*
3. *Consumption of water.*
4. *Impurities.*
5. *Examination of water.*
6. *Storage of water.*
7. *Hardness of water.*
8. *Distribution of water.*

1. *Sources.*—The origin of all sources of water supply must be the rainfall, though the actual method of supply may be by (*a*) *rain water*, (*b*) *lake water*, (*c*) *river water*, (*d*) *spring water*, (*e*) *well water.*

(*a.*) *Rain water* itself is pure, and where it comes but little in contact with injurious gases and matter it is the best form of supply. This, however, but seldom happens, except in sparsely populated and rocky districts. The amount of rainfall varies in different districts from under 25 in. to over 80 in. in the British Isles; the lowest average fall being about the South Eastern Counties of England and the highest being the Western part of Scotland. Part of the rainfall sinks into the ground, part is evaporated, and part is carried along the surface of the ground and fills the rivers and lakes, &c., in the neighbourhood. Rainwater should never be allowed to run to waste, as it is most agreeable for washing purposes, and, in some instances, it has to be used for dietetic requirements, notably in Holland, where collecting areas are specially prepared.

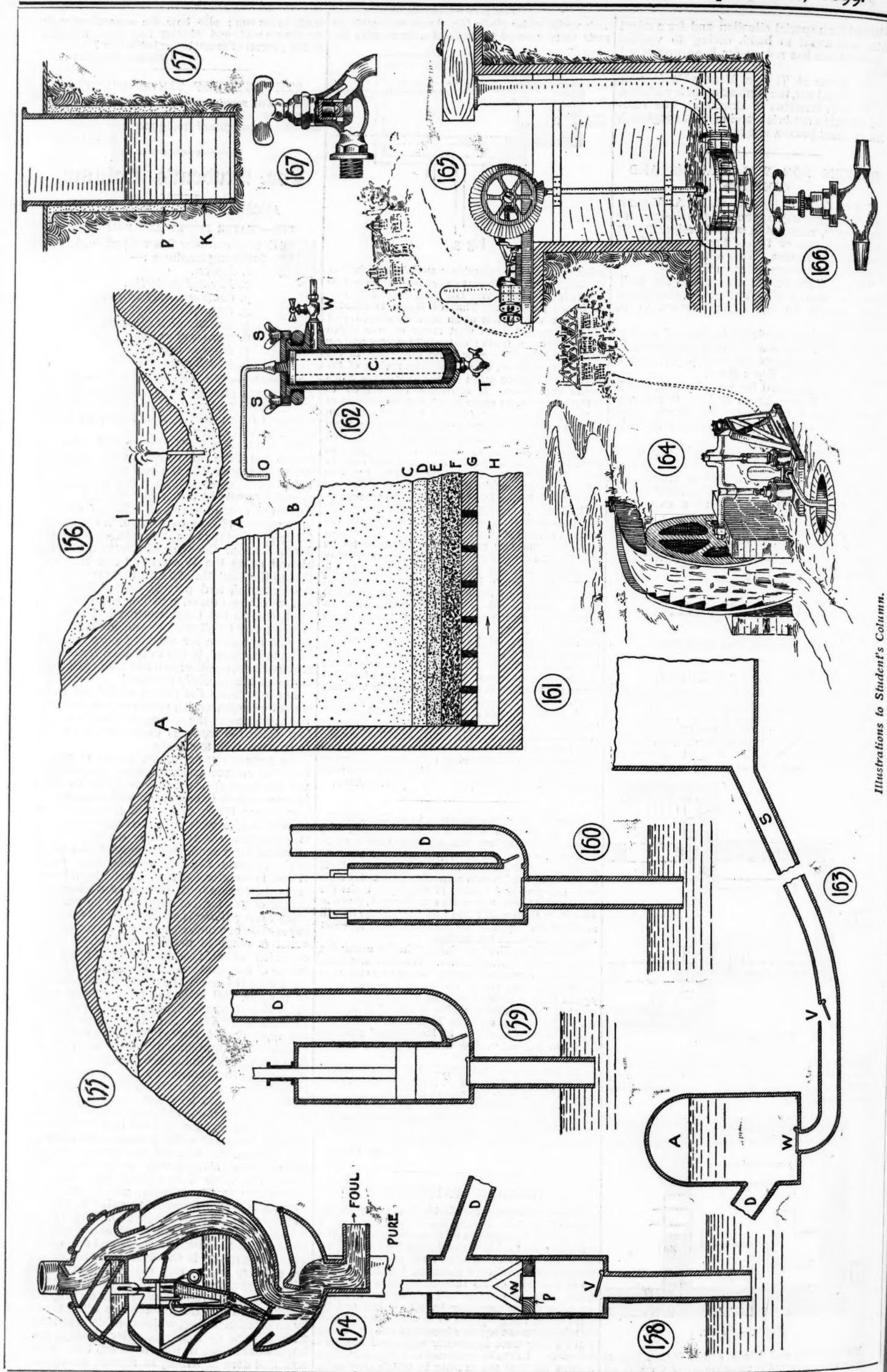
Fig. 154 shows the section of *Roberts' Rainwater Separator*, which runs the foul water to waste, and when the roof has ceased to deliver foul water the canter is overbalanced and the clear water runs to storage.

(*b.*) *Lake Water* derives its source of supply from the surface water previously mentioned, and also from springs, and is liable to have foreign matters in suspension and solution.

(*c.*) *River Water* is derived from the same sources as lake water. Rivers are very liable to pollution, owing to the drainage from manured farm land, and to animal and vegetable impurities being washed into them. When, in addition to these, sewage from towns and villages and trade effluents are added, the danger of this form of supply may be realised.

(*d.*) *Spring Water* is generally found where an impervious bed underlies porous strata, and an outlet is obtained as at A in fig. 155. The condition of this water depends upon the nature of the soil through which it has passed.

(*e.*) *Well Water* may be either from shallow or deep wells, that from the former being very liable to pollution from organic matter washed through the soil. An impervious lining (steining) should always be used as deep as practicable to minimise this risk, as shown at K in fig. 157, the lining also being taken above the surface to prevent any matter flowing in from the top. A cover should also be provided. The water should be drawn up by a pump if possible; three forms of the latter are shown in figs. 158, 159, and 160, and not by a bucket and rope, as these are liable to become foul and to taint the water. Fig. 158 illustrates a section of an ordinary *lifting pump.* As the piston P is raised, the valve V is opened and water is drawn up into the cylinder, and at the next stroke it is drawn through the valve W and is conducted to the delivery pipe D. Fig 159 is a section through a *force pump*, and it will be noticed that the piston is solid, and the water after being raised in the cylinder is forced up the delivery pipe. Fig. 160 is a force-pump with a plunger in lieu of a piston, and is generally preferred because the packing is easily renewed. Deep wells are often made by an artesian boring, which consists in forcing an iron tube of small diameter through the impervious strata, as shown in fig. 156. This was first done at Artois, in France, hence the



Illustrations to Student's Column.

name *artesian*. Water derived from this source is generally palatable and good. It will be seen that in this sketch the impervious strata I extends above the level of the sinking, and consequently the water will not only rise in the pipe but will be forced up to overflowing.

2. *Physical Properties.*—A cubic foot of water may be taken as weighing 62·5 lb., and a gallon as weighing 10 lbs. A fundamental property of the fluid is that the pressure exerted by it on any plane is always in a direction at right angles to that plane, and pressure exerted anywhere on water is transmitted equally and undiminished in every direction. Liquids maintain their level even though the continuity of the surface be interrupted, or in more popular phraseology, they find their own level. Water may be taken for practical purposes to be incompressible. Advantage is taken of the latter and of the power of transmittability of pressure in the hydraulic lift and ram, &c.

3. *Consumption of Water.*—The ancient Romans must have used over 300 gallons per head per day, owing to their elaborate public baths. From about 35 to 50 is now usually considered sufficient for towns and from 20 to 25 for rural districts. However, it is hoped that the supply will be looked upon in a more generous light in the future, as the health of a community must depend to a large extent upon its water supply and its facilities for taking baths. The following table gives the daily average number of gallons per head in several cities :—

Washington	158	Chicago	75
Middlesbrough-on-Tees.	140	Montreal	55
Karlsruhe (Germany)	130	Glasgow	50
New York.....	100	London	35
		Paris.....	28

4. *Impurities.*—Water nearly always contains foreign matter in suspension and solution, absorbed gases, microbes, and other living organisms. Water for dietetic purposes must not contain more than a certain percentage of these impurities. Matters in suspension may be removed by filtration and settlement, those in solution by distillation, aëration, precipitation, and nitrifying organisms. Absorbed gases may be expelled by boiling and distillation, living organisms may be reduced by filtration and settlement, &c.

Distillation is effected by evaporating water and condensing the steam. Distilled water is unpalatable, but on aëration it becomes less unpleasant; this latter may be accomplished by exposing it to the air in thin streams.

Boiling removes temporary hardness and destroys microbes, but the water requires aëration afterwards, as it is unpleasantly flat.

Nitrification is the process by which, owing to the action of microbes, nitrogenous organic matter is oxidised with a formation of nitrates.

Filtration is resorted to to get rid of suspended matters and to oxidise organic substances. Dr. Percy Frankland has shown that over 95 per cent. of microbes were removed from Thames water by sand filtration. These sand filters are mostly used by the larger water Companies. A section is shown in fig. 161 of one that is sometimes employed. C represents a bed of clean sharp sand about 3 ft. 6 in. thick, D is another layer of sand coarser than C and about 4 in. deep, E is another layer of sand coarser than C and about 3 in. thick, F is a bed of gravel about 6 in. deep, G represents a course of bricks laid with open joints to allow the water to pass through to the trough H, which conveys it to the storage reservoir. Magnetic carbide of iron covered with a layer of sand has also been successfully utilised for filters, but this must be used on the intermittent principle, to allow of aëration. The *Pasteur Chamberland* filter is made of porous porcelain, through which the water is forced under pressure. The residue left on the outside of the tubes can be easily removed, and by heating them periodically they may be sterilised. At Darjeeling 9,500 of these tubes are in use in thirty-eight cells in the municipal waterworks, and supply 150,000 gals. a day.

Household filters, until quite lately, were almost solely designed for the purposes of removing suspended matters, to lessen hardness, and to reduce the danger of organic matter. In recent years, however, the removal of micro-organisms has been found to be essential, and it was then discovered that most of the old filters were simply breeding-places for these germs, so that, instead of removing them, they were actually increased to an enormous extent. The Berlin Inquiry of 1886 did much to remedy this evil; and the inquiry for the German War Office, in 1895, by Dr. Plagge gave great prominence to the *Pasteur Chamberland* and *Berkefield* filters. These latter have now sealed the fate of the older forms of filters, and this type of porcelain candle is now recognised as being the one on which future developments must be based. They require pressure to work efficiently, and consequently are termed "pressure filters." Fig. 162 shows a section of the *Berkefield*. The water supply is connected by the tap W, and flows into the outer covering, which is of enamelled iron, and through the hollow cylinder C (of porcelain or kieselguhr), and from the interior of which it is delivered to the outlet pipe O. By means of the thumb-screws SS the candle of porcelain may be removed for cleansing or may be sterilised by boiling.

5. *Examination of Water.*—The following simple tests may be made by any one. Samples should be collected in long tubes, 2 in. or 3 in. in diameter, which latter have previously been well rinsed out with a little acid and then several times with the water which it is desired to examine. If river or lake water is the subject of the inquiry the samples should be taken at various points and beneath the surface, and a note should be made in each instance of the exact locality from whence they are taken. The tubes should be well stoppered and placed in the light, but an inch or two should be left from the surface of the water to the underside of the stopper. They should stand for twenty-four hours, and then be examined to see if vegetation is encouraged; this can be detected by the smell. If this is not apparent, slightly warm the tubes and test them again. A similar tube should be filled with distilled water and be placed alongside the others on a sheet of white paper, and the colour compared. If a drop of Condy's fluid (permanganate of potassium) be placed in the water, and it becomes bleached in a short time, it is a sign of the presence of organic matter. A portion of the water may be evaporated, and the residue burnt; if it blackens it indicates the existence of animal organic matter. If a sample of water is put on a gelatine film resting on a plate, organisms multiply rapidly and are easily discernible under the microscope.

6. *Storage of Water.*—This is best accomplished, if it can be so arranged, in underground tanks, in which there must be no liability to pollution. It is thus rendered more palatable by its power of assimilating carbonic acid gas under the ground. Domestic cisterns of lead are to be avoided, owing to the danger of the water carrying away the soluble oxide of lead due to the presence of oxygen. Hard water, however, forms a protecting surface on the lead, and there is little danger in using this metal for its storage. Galvanised iron is simply iron covered with a coating of zinc, and most waters will dissolve this; it should not, therefore, be used if it can be avoided. Slate and earthenware cisterns, therefore, should be used where possible. Provision should be made so that cisterns may be cleaned out regularly, for it must be remembered that they become a depositing ground for impurities in the supply. All cisterns should be covered to prevent their pollution by dust, dirt, and possibly dead birds, and they should be ventilated, and have an overflow pipe, with its open end, as far from any sewer or drain as possible.

7. *Hardness of Water.*—This may be either temporary or permanent. *Temporary hardness* is due to the presence of calcic and magnesic carbonates and may be overcome by boiling, which expels the carbonic acid and precipitates the carbonates. *Permanent hardness* is due to calcic and magnesic sulphates, which boiling does not effect. Hard water will not dissolve soap but precipitate it; hence the soap test is now usually employed for determining the hardness of water. Every grain of calcic carbonate or its equivalent in one gallon of water constitutes one degree of hardness.

The effect of hard and soft water on the health is a much debated point, but from an economic point of view, soft water is much preferable, and it is said that in Glasgow, since the soft water supply from Loch Katrine was introduced, that a saving of over 30,000*l.* in soap was effected per annum. Hard water also causes lime deposits in boilers, kettles, and hot-water pipes; it is unpleasant for domestic use as it produces roughness of the skin. Dyspepsia, gravel and stone in the bladder, and swellings of the glands have also been attributed to its use. The late Sir Douglas Galton suggested that 10 deg. of hardness would satisfy the general requirements of a town supply. Dr. Clark's process for removing temporary hardness consists in the addition of lime, by which means the bicarbonate of lime in the water is reduced to a carbonate, which latter is precipitated. A Luton Hoo the hardness of the water is reduced from 18½ deg. to 4 deg. by this process, and 70,000 gallons can be softened per diem. Permanent hardness of water at Penarth is reduced from 18 deg. to 6 deg. by the addition of 22·5 lbs. of lime, 5 lbs. of soda, and 1 lb. of alum to every 10,000 gallons of water. Clark's process consists in the addition of 1 oz. of quicklime to every 100 gallons. The Porter-Clark system is a modification of this, the precipitated calcic carbonate being removed by cloth filtration under pressure, thus avoiding the delay of slow subsidence.

8. *Distribution of Water.*—This is effected either on the constant or intermittent principles. Every water company should be compelled by the legislature to provide a constant supply, as it is not only more conducive to health, but in the case of outbreaks of fire the lack of water is a very serious matter. Even with the constant supply, however, it is wise to have a small supply cistern, as the water is sometimes necessarily cut off for repairs to mains and other causes. Water mains are frequently not laid sufficiently deep below the surface, and consequently are liable to be affected by heat and by frost; they should not be less than 4 ft. below the ground level. The pipe mains are usually of iron, coated with bitumen, magnetic oxide, or some preservative solution. The best method is to have a glazed lining, but this is, of course, somewhat costly. Lead pipes are most often used inside the house owing to their preference by the water companies; but, as previously mentioned, the lead is liable to be dissolved by the water if the latter is of a soft description. If possible, it is always best to use pipes lined with either glass or tin. Stopcocks should be arranged so that any branch supply may be cut off from the main, and all pipes should be run so that there is no danger of frost affecting the water-supply. If, in any case, it is found necessary to have them outside the building, they should be covered with asbestos, felt, or other non-conducting material.

All water for drinking purposes should be drawn direct from the main supply pipe.

In country houses it frequently happens that no spring or supply exists above the level of the house, and, consequently, the water has to be raised by mechanical means. One method often employed is the *Hydraulic Ram*, whose action is as follows :—A supply pipe, S in fig. 163, is taken from the reservoir to the air vessel A (or *ram*). A finely-balanced valve is fixed at V, whose weight is a little greater than the water pressure from the reservoir. Hence when the water is at rest in the supply pipe the valve V opens downwards and water runs to waste. As the velocity of the water increases, the valve V is closed, and the momentum opens the valve W, and water is thus forced into the air vessel; the air in the latter is compressed, and by its reaction the water is forced up the delivery pipe D. The pressure in the supply pipe is thus diminished, and both valves therefore fall and the water escapes at V until this valve is again closed by the impact of the water due to the increased velocity, more water enters the ram and is raised higher in the delivery pipe. This action is continually repeated while the supply in the reservoir is maintained. It is estimated that about one-eighth of the water is wasted. The following formula and notes on the hydraulic ram may be of use.

When :—

Q = quantity of water used in cubic feet per second.

h = head of water in feet (*i.e.*, difference in level of reservoir and ram).

P = effective horse-power.

Then $Q = \frac{14{\cdot}7\ P}{h}$

and $P = {\cdot}068\ Q\ h$.

The length of the supply pipe should not be less than three-quarters of the height to which the water is to be raised.

The diameter of the supply pipe should be equal to $1.45\sqrt{Q}$, and the diameter of the rising pipe should equal $75\sqrt{Q}$.

The contents of the air vessel should be the same as the contents of the rising tube. One-seventh of the water may be raised to four times the head of the reservoir, or one-fourteenth eight times, or one-twenty-eighth sixteen times, &c.

A greater fall than 10 ft. is to be avoided as it involves too much wear and tear on the valves. *Water wheel* driving pumps, both over-shot and under-shot, may be used for this purpose of raising water, and fig. 164 shows a sketch of one used by Messrs. Merryweather & Sons. *Turbine* driving pumps are also used, as shown in fig. 165. Arrangements may also be made when fixing this latter for driving electric lighting, laundry, and refrigerating machinery.

GENERAL BUILDING NEWS.

CONGREGATIONAL CHURCH, HESSLE, YORKSHIRE.—The foundation-stone has just been laid of a new Congregational church at Hessle. The architect is Mr. Percy T. Runton, of Hull and Hessle. The building will be in the Gothic style, comprising nave, aisles, chancel, organ transept, ministers' vestry, heating vault, &c. It will be built of red brick and stone, with tracery windows and dressings. The floor will be of maple blocks upon concrete. The interior will be finished in plaster, and the nave arches carried upon granite shafts. The length of the nave is 75 ft., and into the chancel 87 ft., the width across nave and aisles being 50 ft.

CHURCH, KIRKCALDY.—A church which has been built by the Kirkcaldy Unitarian congregation has just been opened. The church, which is situated in Hunter-street, in a central part of the town, is seated for 200 persons, and at the back are a committee-room, a vestry, and other offices. The architect was Mr. Arnold S. Taylor, of Westminster, the cost of the building, including the site, being about 1,100*l.*

MOUNTPOTTINGER UNITARIAN CHURCH, BELFAST.—On the 26th ult. the Unitarian Church at Mountpottinger was reopened after alterations. By the alterations to the building the accommodation has now been doubled, while a side entrance has also been added. Three memorial windows have been placed in the building. The work has been carried out by Mr. Robert Corry, builder, under the supervision of Messrs. Young & Mackenzie, architects.

PRIMITIVE METHODIST CHURCH, OSWESTRY.—A new Primitive Methodist church has just been opened at Oswestry at the corner of Chapel and Castle streets. Perpendicular Gothic in style, the walls are of Ruabon red bricks, with white sandstone dressings, and a tower, with spire, marks the angle formed by the streets, the principal front being in Chapel-street. The internal fittings are of pitch pine, and the seating accommodation, which is designed to provide accommodation for 425, is arranged in amphitheatrical form. The architect is Mr. J. D. Mould, of Manchester, and the contractor Mr. Jabez Higgins, of Oswestry; the cost of the new building is close on 2,000*l.* Mr. Evans, of Manchester, was responsible for the electric light installation, and Messrs. John Minshall & Co., of Oswestry, supplied and fixed the heating apparatus.

NEW CHURCH OF BALLINTUBBER, CO. ROSCOMMON.—The dedication of the new Church of St. James, Ballintubber, will take place on the 9th inst. The new church consists of chancel, nave, transepts, and sacristy, and is of cruciform shape. In length it is 100 ft. long, the nave 31 ft. wide, and 67 ft. on the transepts. Mr. J. L. Scallan is the architect. The contractor is Mr. John Whelan, Strokestown.

WELSH WESLEYAN CHAPEL, FERNDALE, GLAMORGANSHIRE.—The foundation-stones of a new Welsh Wesleyan Chapel, Ferndale, on the site of the building which was entirely demolished by fire in June last, were laid recently. The contractor is Mr. Howell Lewis, Ferndale, and the architect Mr. A. O. Evans, Pontypridd.

BOARD SCHOOL, HOTWELLS, BRISTOL.—An infants' school is being erected at the corner of Albemarle-row and Joy Hill, Hotwells. It is planned on the central-hall system. Surrounding the hall and entered from it are four class-rooms, each for fifty children, a teachers' room, and a children's cloak-room and lavatory. The floors are laid with maple blocks. The whole building is heated with hot water, and under a portion of the school is a covered playground. Red brick with freestone dressings has been used, and the roofs are tiled. The general contract has been carried out by Mr. G. Humphreys, the heating work has been executed by Messrs. Skinner, Board, & Co., and the plumbing by Mr. A. Scull. The architects are Messrs. La Trobe and Weston.

SCHOOL, DESKFORD, BANFFSHIRE.—A new Board School is to be erected at Deskford, from plans by Mr. John Fowlie, Cullen. The building will provide accommodation for 150 pupils.

NEW THEATRE, DONCASTER.—A new theatre was opened at Doncaster on the 27th ult. The new building will seat 1,500 persons. The stage is on the street level, and can be driven upon therefrom. It is 75 ft. wide by 32 ft. deep. Mr. Chapman, the manager, drew the plans; and Mr. J. P. Briggs, of London, was consulting architect. The builders and contractors were Messrs. H. Arnold & Son, of Doncaster. The seating and decorations were by Messrs. Deans, of Birmingham; the electric installation by Messrs. Fisher & Allison, of Doncaster; Messrs. E. Oldroyd & Co., of Leeds, fixed the heating apparatus and fireproof curtain; and the fire hydrants and Grinnell sprinkler installation were fixed by Messrs. Dowson, Taylor, & Co., of Leeds and Manchester.—*Yorkshire Post.*

NEW LODGE, BEAULANDS PARK.—The erection of a large new lodge will shortly be commenced for Sir R. G. Graham at the south entrance to Beaulands Park, Cumberland. Dressed local red stone will be used, and green slates on steep pitched roofs with four gables. The contractor is Mr. W. Wright, of Warwick Bridge, who will execute all the work from plans prepared by Mr. T. Taylor Scott, architect, of Carlisle.

MEMORIAL HALL, BELFAST.—The George Thomson Memorial Hall, which has been erected by the Broadway Presbyterian Church, has just been opened. The new buildings occupy a site adjoining the rear of the church itself. A minor hall, about 30 ft. by 26 ft., with vestry and committee rooms, forms the principal portion of the ground floor. A ladies' parlour is also placed on this level. The first floor is taken up with a lecture hall 64 ft. long by 32 ft. wide, with a platform at one end, having a separate staircase. All the walling is of red brick, with Dumfries sandstone sills and coping. The contractor for the work was Mr. Thomas M'Millen, and the architects were Messrs. Young & Mackenzie, Belfast.

ISOLATION HOSPITAL, LEICESTER.—The foundation-stone has just been laid of the administrative block of the new Isolation Hospital on the Gilroes Estate, near Leicester. The architects are Messrs. Blackwell & Thomson, of Leicester, whose plans were selected in competition. The work has been in progress for six months, and several of the scarlet fever pavilions are in a forward state. The hospital, when completed, will consist of four separate one-storied pavilions for the treatment of scarlet fever, giving accommodation for twenty-six beds each; a similar pavilion for typhoid fever containing twenty-eight beds; two isolation pavilions—one a two-story building—containing twenty-eight beds, making accommodation for 160 adult patients. The other buildings comprise the administration block, discharging block and mortuary. The total number of beds, if the full extension were carried out, would be 240. The several buildings are connected by macadam roads without covered ways, the ambulance vans thus being able to drive up to the door of each block. The four scarlet fever pavilions are all arranged alike, and consist of two main wards, 72 ft. long and 26 ft. wide, to contain twelve beds each. In the central portion is provided a separation ward of two beds leading out of the ward corridor, and having its own lavatory and water-closet. The nurses' kitchen is centrally placed, and can overlook the beds in the two main wards by means of observation windows. The ward linen store-room is approached from the nurses' kitchen, and the coal store for the wards is placed outside, near the entrance to the pavilions. At the outer end of each main ward is placed on one side the sanitary tower, disconnected by a ventilated lobby, and on the other side the bath-room. The typhoid pavilion is similar in plan to the scarlet fever pavilions with this exception—as the block will be used for two sexes it is necessary to provide two separation wards instead of one, as in the scarlet fever blocks. The one-story isolation block provides for a total of twelve beds. The two-story pavilion is arranged on two floors. On both floors in each half two two-bed wards are provided, leading on to the verandah, with nurses' kitchen and larder. The sanitary towers are approached from the verandahs. A bath on wheels is provided, placed outside the nurses' kitchen. The first floor in each half is approached by an open stone staircase at the extreme end of the verandahs. The floors are of fireproof construction. The administrative block contains on the right of the front main entrance committee-room, doctor's sitting-room, lavatory, &c., dispensary, laboratory, store, waiting-room, and telephone enclosure; and on the left of the entrance, matron's sitting-room office, nurses' mess-room, sitting-room, sewing-room, household linen-room, dry goods store, lavatory, &c., servants' hall. The servants' hall and nurses' mess-room are placed in close proximity to the kitchen. The main corridor is 7 ft. wide. At the west end of the administrative block, and leading at right angles from the main corridor, is another corridor out of which lead the kitchen and stores, &c. The first floor contains the nurses' and matron's bedrooms, with bathrooms, &c., and linen store. The doctor's bedroom and bathroom are also on this floor, and are approached by a separate staircase. Twenty bedrooms for nurses are provided on this floor. The second floor contains ten bedrooms for servants, a bathroom, &c. The porter's lodge is situated on the right hand side of the main entrance from Groby-road, and stands 15 ft. back. At the rear of the porter's lodge, on the right hand side of the entrance roadway, is the discharging block, which is arranged in duplicate for male and female patients. The mortuary consists of a post-mortem room, mortuary, and viewing chamber. Heating is to be by low pressure steam, with auxiliary heating arrangements consisting of stoves and grates. The facings to all the buildings are Ellistown brick, with stone dressings, and the roofs are covered with green slates. Between all the buildings there will be telephonic communication. Messrs. J. Johnson, are the contractors for the building, with Mr. John Clifton as clerk of the works.

EXTENSION OF THE BIRKENHEAD BOROUGH HOSPITAL.—It is intended to proceed at once with the extension wing of the Birkenhead Borough Hospital. The designs of the new building have been prepared by Mr. E. Kirby, and the contract has been given to Mr. Richard Allen, of Birkenhead. There will be a separate entrance to the new wing, which will be connected with the present building by a covered bridge. It will provide accommodation for a woman's ward with twelve beds for surgical cases, an isolation ward for erysipelas, a waiting-room for patients, and surgical and consulting rooms.

LORD'S CRICKET GROUND.—Further provision of spectators' seats is being made, and upon an extensive scale, along the south and east sides of the match-ground. On the site of the old billiard-room and tennis and racquet-courts and of an adjacent house, Messrs. J. Simpson & Son, contractors, are erecting a lofty tier of seats, supported by iron and wooden columns, which is carried upon brick arches in the form of an amphitheatre round the south-east corner of the ground to about half-way up the "Nursery end" (opposite the members' pavilion). The new structure, a quarter of a circle in shape, will give room for, it is estimated, 10,000 persons. New dressing-rooms for the ground bowlers are also being built at the Nursery end, and the members' luncheon-room next, westwards, to the tavern has been enlarged. Messrs. Walter Holt & Son, of Croydon, are the contractors for the new tennis and racquet courts, upon ground recently acquired by the M.C.C. at the rear of the pavilion. The progress of the latter works has been delayed, pending an arrangement with the owners of some adjoining property.

ISOLATION HOSPITAL, GOSPORT.—An isolation hospital has just been erected at Gosport. Early last year plans were prepared by Mr. G. E. Bolshaw, architect, of Southport, and the construction was commenced by Mr. John Croad, builder, of Gosport, under the supervision of Mr. H. Frost (Surveyor to to the Council), assisted by Mr. A. E. Dixon. The hospital stands in the centre of a field of two acres. There are three distinct buildings, the hospital itself being quite apart from the administrative and laundry blocks. Internally there are two distinct hospitals, each having an entrance of its own. At the western end scarlet fever patients will be treated; cases of typhoid fever being allotted to the eastern end. There is room for sixteen beds. Separate wards for men, women, and children are provided at both ends of the building, that at the western end for women being 36 ft. in length by 22 ft., and containing five beds; while that for men is 24 ft. by 16 ft., and contains two beds. The eastern end is of a similar design. Nurses' rooms are also provided, and a verandah, 40 ft. long by 10 ft., surmounts the necessary offices.

NEW ACCIDENT HOSPITAL FOR ALLOA.—On the 30th ult. the Earl of Mar and Kellie opened the new accident hospital which has been provided for Alloa and district. The new building has been erected from plans by Mr. R. A. Bryden, architect, Glasgow, and is situated to the west of the old hospital in the Sunnyside district of Alloa. The main building consists of a central administrative block and two wings—one containing wards for males and the other for females. Each of the wings contains one ward for six beds, one ward for three beds, and two private wards for one bed each. The wards are approached from the central part of the building by wide corridors. From these corridors the latrines enter at the back; ward sculleries are also provided, entering off the corridors. The floor of the wards is of pitch pine, and all corners are rounded. The lower walls of the corridors are lined with tiles, and each corridor has an exit porch for convalescent patients obtaining access to the grounds in rear of the buildings. The central part of the building contains toward the front the entrance vestibule, doctors' room, and men and women's day-room, behind which are placed the operating-room, doctors' store, kitchen and scullery, service pantry, and matron's store-room, &c. The central building is two stories in height, and on the upper floor contains matron's rooms and seven bedrooms. To the rear of the main building is the probationary ward, as also the washing-house, laundry, and drying-room. In the laundry is a hydraulic washing-machine—both these machines being fitted up by Messrs. Watson, Laidlaw, & Co., Glasgow. The boiler-house is at the east end of the building, the high-pressure boiler being supplied by Messrs. Marshall & Co., Motherwell. Adjoining this is a pumping-room, containing a hydraulic engine to be utilised for pumping purposes. There is likewise a fumigating-room in this part of the building. The whole of the apartments are fitted up with electric bells.

REREDOS, ST. MARY'S SCOTTISH EPISCOPAL CHURCH, MONTROSE.—A reredos, which has been erected in this church in memory of the late Rev. John Woodward, was unveiled on the 1st inst. The three central arches of the reredos have been filled with mosaic work by Messrs. Powell & Sons. The sculpture work was executed by Mr. Alexander Neilson; the architects were Messrs. Ross & Macbeth, of Inverness.

SANITARY AND ENGINEERING NEWS.

LINCOLN.—At the last meeting of the Lincoln Corporation it was decided to make application to the Local Government Board for loans amounting to upwards of 10,000*l.* for additions and alterations to the markets and for building a model abattoir. Plans are also in hand for a City Isolation Hospital, the site of which has already been secured. Many of the leading sanitary engineering firms have also already responded to the invitation of the local committee to exhibit at the Health Exhibition to be held in the Drill Hall, Lincoln, from August 3 to 19. This exhibition, the first of its kind ever held in the county of Lincoln, is being arranged in conjunction with the annual provincial meeting of the Sanitary Inspectors' Association.

SEWERAGE WORKS, EALING.—At the Council Chamber, Victoria Hall, Ealing, recently, Major-General Darley Crozier, R.E., Local Government Board Inspector, held an inquiry into the application of the District Council for sanction to borrow 10,150*l.* for works of sewerage and sewage disposal, and 350*l.* for providing scavenging plant. Mr. Charles Jones, surveyor, produced and explained the plans.

BURLEY-IN-WHARFEDALE WATER SUPPLY BILL.—This Bill has passed the Commons Committee. Its object is to acquire a catchground of 300 acres on Burley Moor. The moor is common land, and a clause has been inserted in the Bill to meet the wishes of the Commons Preservation Society. The scheme provides for a reservoir holding 15½ millions of gallons, to impound Carr Beck, and also for the purchase of the water rights of Mrs. Crofton, the Lady of the Manor of Burley. The dam will be about 400 yds. long and 31 ft. in height. The Bill was grouped with the Horsforth Water Company's Bill to acquire the same catchground, and the Horsforth District Council's Bill to acquire the company's undertaking, the Council strenuously objecting to take over the Company's Burley Moor scheme as costly and improvident. Thus the Burley scheme was opposed by the Horsforth Company, while the latter's scheme was opposed by both the Burley and Horsforth Councils. After hearing the evidence for the Horsforth Council and the Company, the Committee passed the former's bill to acquire the Company's undertaking; but before deciding the fate of the Company's bill, called upon the Burley Council to submit evidence. Their engineer, Mr. Malcolm Paterson, C.E., was then called, and after a long cross-examination the Committee passed the Burley Bill without further evidence. The engineer's evidence chiefly turned upon the needs of Burley, which is a growing residential district adjacent to Ilkley, the suitability of the proposed catchground, and the defects of the alternative scheme set up by the Horsforth Company. He objected to the reservoir site as dangerous, owing to the sandstone rock underlying it. By gaugings he had proved that the bulk of the dry weather flow of the Rushy Beck escaped, issuing in springs below the site proposed, and would be lost. The reservoir would not supply the highest houses in the district, and, further, the catchground was insufficient in area as a permanent source. A series of clauses for insertion in the Bill were submitted on behalf of Mrs. Crofton, but the committee rejected the whole, allowing only the usual sporting rights clauses as offered by Burley. Mr. James Mansergh, C.E., and Mr. E. J. Silcock, C.E., gave evidence on behalf of the Horsforth Council, and Mr. H. A. Johnson, C.E., on behalf of the Horsforth Waterworks Company.

THE LONDON, WALTHAMSTOW AND EPPING FOREST RAILWAY.—The railway company will promote a Bill during the current Session for making a line from the site of Cazenoves House, Upper Clapton-road, to pass thence eastwards across and underneath the Avenue and Mount Pleasant-lane, and to terminate by a junction with the Cambridge line of the Great Eastern Railway where it crosses the river Lea, and for amending their Act of 1894 so as to provide for a less amount of lands being purchased by them and substituted for a lessened amount of commonable lands, Walthamstow Marshes, to be taken under that Act for railway purposes.

STAINED GLASS AND DECORATION.

WINDOW, OCKBROOK PARISH CHURCH, DERBY.—A stained-glass window, by Mr. A. O. Hemming, of St. Margaret's-street, Cavendish-square, W., has been placed in Ockbrook Parish Church, Derbyshire, to the memory of the Ven. Melville Horne Scott, Archdeacon of Stafford, Canon of Lichfield, and twenty-one years Vicar of Ockbrook, and brother of Sir Gilbert Scott.

MEMORIAL WINDOW, HOLY TRINITY CHURCH, BATLEY CARR.—Stained glass has been inserted into the east window of this church by Mr. George Fox, to the memory of his father. The window is designed to portray in some measure the three Persons of the Trinity. Messrs. Powell Brothers, of Leeds, have carried out the work.

HALBERTON, NEAR TIVERTON, DEVON.—The parish Church of St. Andrew has been reseated with open oak benches, for the Rev. Prebendary Gregory, R.D. They have traceried ends with square flowers and other carvings, and have been carried out by Mr. Rogers, carver, of Exeter, from the designs and detailed drawings prepared by Mr. E. Swinfen Harris, architect, of London and Stony Stratford, under whose care the work here, extending over more than twelve years, and comprising new reredos, eagle lectern, works in chancel, painted decoration, stained glass, tiled pavements, altar cloths, &c. have been carried out.

FOREIGN.

FRANCE.—The jury in the competition for the best designs for façades of Paris houses have awarded premiums to M. Marquet, for his houses in the Rue de Grenelle; to M. Debrie, for a house in the Rue Roi de Sicile; to M. Guimard, for the "Castel Béranger," Rue Lafontaine (Auteuil); to M. Rabier for his house in the Boulevard de la Villette, and to M. Breffendille for a house in the Rue des Petits Champs.——The twenty-seventh Congress of Architects will be held this year at Tours and at Paris, and will include excursions to Poitiers and Angoulême.——Some new casts after the monuments found at Delphi and Delos have been placed in the colonnade gallery of the Louvre.——A new Art Society under the title "L'Estampe Originale en Couleurs" has been started in Paris under the presidency of M. Rafaelli, the painter.——The Municipal Council of Paris has authorised the purchase of the Hôtel de Lauzun, on the Quai d'Anjou, at a cost of 300,000 francs.——M. Dubois has just completed the model of his statute of the late Duc d'Aumale, whose figure is represented reclining on a tomb holding in one hand a sword and with the other pressing a flag to his heart. The bronze statue of Cardinal Lavigerie by M. Falguière is to be erected shortly on a public place in Carthage, and a copy of it at Bayonne. M. Falguière is now commissioned to execute the statue of Daudet to be erected at Nimes, while M. de Saint-Marceaux is to carry out that which is intended for the Luxembourg Garden.——A museum of art is to be formed at Cherbourg.——The jury of the competition opened for the erection of a museum at Valenciennes has awarded the first premium to M. Dusart, the second to M. Armbrustér, and the third to M. Lemaire.——M. Benjamin Leroux, a member of the Société Centrale des Architectes, has just died at the age of fifty-four. He was "architecte-voyer" at Courbevoie, and architect of a number of buildings in Paris and at Neuilly, among which may be mentioned the English Church in the Boulevard Bineau.——The death is also announced, at the age of seventy-eight, of the Marquis de Chennevières, member of the Académie des Beaux-Arts, formerly Curator of the Luxembourg Museum, and, in 1873, Directeur des Beaux-Arts. He was the author of some highly-esteemed works on French art.

COLOGNE.—With the recent retirement of the well-known City Engineer of Cologne, Herr Stuebben, the transitional period through which the old cathedral city may be said to have passed during the last fifteen years has come to an end, and any one who has not visited the town since the early eighties would be surprised at the remarkable change which has been wrought. The new boulevards are now complete in every way, *i.e.*, they are lined on both sides with new buildings, and what was formerly a skeleton has become full of life. The suburbs of Cologne have also rapidly developed, and a very large number of excellent villas are now to be found on the outskirts of the city proper. As regards the general arrangement of the boulevard, a broad thoroughfare has been formed showing a three-quarter circle in plan, broken from time to time either by squares or widened out to take the form of double avenues. The so-called "German" Ring has a width of quite 400 ft., whilst the average boulevard width may be taken as slightly over 100 ft. The city is now rapidly extending to a second line of fortifications, so that in another twenty years' time the formation of a second or outer boulevard is by no means improbable.

BUILDING INDUSTRY IN THE COLONIES.—The April Circulars of the Emigrants' Information Office state that in Canada the demand for mechanics is not good, but a competent man, who lands with a little money, is fairly certain, except at Toronto or in British Columbia, to obtain work before long. In New South Wales, at Uralla and Grafton in the far north, there is a fair demand for farm labourers and carpenters. At Sydney the building trade is now better than it has been for a long time, and carpenters and joiners have had their wages raised 1s. a day. In Victoria, local labour is generally sufficient, but the building trade in the Colony has revived and shows more activity than it has for some years. A skilled mechanic who lands with sufficient money to provide for himself and family during the first few weeks would have a reasonable prospect of finding remunerative employment, especially in country districts. Carpenters, joiners, and bricklayers have all received an advance of 1s. a day in Melbourne; but the demand for them is not brisk, as—owing to the large number of vacant shops and houses—few new buildings are being erected. There is a good demand for a limited number of thoroughly skilled plumbers on the Melbourne drainage works, which will take years to complete. In Queensland there is a general demand throughout the Colony for ploughmen and other farm labourers, but not for mechanics, though for them also work has been more plentiful lately. The iron foundries at Ipswich and elsewhere have been especially busy, and skilled labour has been difficult to obtain at times. In Tasmania, mechanics at Zeehan and Queenstown, on the west coast, and in the surrounding districts, have been well employed; good mechanics (especially first-class fitters) can always get work, but there is no demand whatever for inexperienced men. In other parts of the Colony there is no general demand for more mechanics. In New Zealand there has been plenty of work lately. The places which seem to have been especially busy are Napier, Wanganui, Otaki, Masterton, Ashburton, Timaru, Oamaru, Dunedin (except in the boot trade), and Invercargill. At Wellington, however, trades, except the clothing trade, have been slack, and at Christchurch a number of stonemasons and carpenters have been out of work. In Cape Colony there is practically no demand for more labour, except in parts for a few skilled mechanics. In the Transvaal, at Johannesburg, there is no demand for labour, but in Pretoria there is a fair opening for skilled mechanics.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.—Messrs. John Hall & Co., Stourbridge, have disposed of the glazed brick branch of their business to a private company, who will trade as "John Hall's Glazed Brick Co., Ltd." The original firm will carry on their fire-clay, fire-brick, and retort works as before.

ALLEGED JERRY-BUILDING IN ABERDEEN.—On Tuesday, March 28, a public meeting, under the auspices of the Operative Masons and Granite Cutters' Union, was held in the Trades' Hall, Aberdeen, for the purpose of calling attention to the alleged prevalence of jerry-building in Aberdeen. Resolutions were adopted protesting against jerry-building, and urging on the Town Council "to take steps to safeguard the workmen as well as the interests of the community by having fully-qualified inspectors or architects to supervise all work to which its Plans Committee gives sanction."

LONDON COUNTY COUNCIL.—The Money Bill which the Council will introduce during the current Session relates to their annual capital expenditure April 1, 1899, to March 31, 1900, and the following six months. Amongst the various objects for which the amounts are to be defined during that time are the following—sites for stations, buildings, river-piers, new float, &c., for purposes of the Fire Brigade Act, 1875; sites and buildings for Council chamber and offices, weights and measures and gas-meter stations, coroners' courts, lunatic asylums, industrial dwellings, technical schools, and workshops; parks, gardens, and open spaces; purchase of White House, Hackney Marsh, and Fairseat House, Waterlow Park; removal of certain gates, bars, or other obstructions in streets; electric lighting on Westminster Bridge and Victoria Embankment; reconstruction of the Isle of Dogs, Rosemary Branch, and certain county bridges; extensions of and precipitation and other works at pumping stations and out falls, new pumping stations, sewerage works, and main and relief sewers; purchase of tramways and equipment of lines for electrical working; Tower Bridge (southern), Wandsworth Bridge (southern) and Lambeth Bridge (eastern) approaches; Evelyn-street, Deptford, Roehampton-street, Westminster, Long-lane, Southwark, Old-street and Goswell-road, Holloway-road, and other street improvements; Highgate Archway and Vauxhall Bridge; and a new street between Tabard-street and High-street, Borough.

OPEN SPACES.—On the 30th ult. was opened to the public the disused burial-ground, about three-quarters of an acre in extent, in Kipling, formerly Nelson, street, Bermondsey (Snow's Fields), that had belonged to Guy's Hospital, which bought the ground in 1789. The ground, which in times past lay amidst the ditches and watercourses of Southwark, and was a favourite haunt of "resurrection men," has latterly been used as a builder's yard. Towards its purchase, for 4,600*l.*, from the hospital authorities, the London County Council contributed 2,300*l.* The remainder has been subscribed by the Metropolitan Public Gardens Association (500*l.*), Guinness's Buildings Trustees (150*l.*), Bermondsey and St. George-the-Martyr Vestries (1,186*l* and 164*l.*), and St. Olave District Board of Works (300*l.*) The London County Council made a further grant of 890*l.* towards the cost of laying-out and enclosing the ground, and providing a gymnasium, the Association contributing to the same purpose a sum of 500*l.*, derived, *ad hoc*, from the Trustees of the London Parochial Charities.—It is stated that the General Purposes Committee of the Middlesex County Council recommend subscriptions of 2,000*l.* towards the proposed laying-out of the Chestnuts Estate (eleven acres) at Tottenham, and 10,000*l.* towards the purchase of the Manor House property, at Ealing.—The Metropolitan Public Gardens Association will shortly be enabled to lay out the churchyard of St. Mary, Plaistow, which has been transferred to the Corporation of West Ham; and in response to their representations the City Corporation have undertaken to consider the question of maintaining many of the city churchyards provided that the Association will re-instate and adapt them for public resort.—The Richmond Town Council have entered into negotiations with Sir Charles Rugge-Price, who lately bought for 100*l.* from the Crown the manorial

and other rights over he whole of the Pest House Common, about 3½ acres in extent, which has formed a public recreation and playground for longer than a century. Sir Charles Rugge-Price intends to cut roads across the Common for developing his property that lies beyond, and the Council are not satisfied, thus far, with the proposals he makes in respect of the restricted use, for recreative purposes, of the remaining portions of the land.

LORD KELVIN ON REFUSE DESTRUCTION.—Lord Kelvin has just prepared a report on some interesting investigations made by Professor Archibald Barr and himself in Edinburgh, Bradford, and Oldham, on the subject of the destruction of town refuse. In one instance he experimented on damp ash-pit refuse, containing a large proportion of night-soil and vegetable matter from markets and shops. This was consumed without the slightest trace of smoke. In addition to this solution of the smoke difficulty the residual products proved to be of great commercial value. In another case the steam produced by the process of destruction was utilised for the driving of electric lighting machinery and other power purposes. No coal or coke whatever was employed, and in this instance also there was an entire absence of smoke. Lord Kelvin's report demonstrates that our public bodies have no longer any excuse for referring to "waste products," but have within their reach the means of turning the most unpromising kinds of refuse to a highly profitable account.—*Times.*

PROPOSED THAMES TUNNEL.—The Bridges Committee of the London County Council have formulated a scheme for the construction of a tunnel beneath the Thames, from Shadwell to Rotherhithe. The total length of the tunnel and its approaches, between Union-road, Rotherhithe, and Commercial-road East, Shadwell, will be 6,825 ft., with thoroughfares in the tunnel of 17 ft. in width for the carriage-way, and 4 ft. 2 in. for each of two footpaths. The total cost of the project is estimated to be 2,198,250*l.*, but of that amount 798,250*l.* is apportioned to the acquisition of property, and the cost of acquiring sites for the rehousing of the industrial classes displaced in carrying out the works.

ALLOYS OF IRON AND NICKEL.—At the meeting of the Institution of Civil Engineers, on Tuesday, March 28, a paper was read on "Alloys of Iron and Nickel," by Mr. R. A. Hadfield, M.Inst.C.E. The paper dealt first with the physical data relating to nickel and iron. The effect upon iron of gradually increasing amounts of certain added foreign elements had already been investigated by the author in experiments upon the mechanical and physical properties of alloys of iron and manganese, silicon, aluminium, and chromium, both in the cast and forged conditions. In the present paper were given the results of a similar investigation of the alloys of iron and nickel. In a research of this nature it was important to avoid as far as possible the disturbing influences of a second foreign element, especially carbon, and this had been done as far as possible. The addition of nickel, either by conferring greater homogeneity or by some particular combination with the iron or carbon present, or both, appeared to confer properties upon the alloy equivalent to an annealing, or, if annealing be employed, to reduce the stress produced by forging; it did this even in the annealed material without injuring or seriously lowering the elastic limit. In this respect, therefore, its presence was of considerable practical utility. The well-known Russian metallurgist, Chernoff, had stated that steel was composed of crystals of metallic iron cemented by carbide of iron, the result being that in the case of nickel-iron alloys the inter-crystalline spaces (a subject which had been fully and carefully investigated by Mr. T. Andrews, F.R.S., as regards ordinary steel) were much more completely filled, and the cohesion consequently rendered more powerful. The points of solidification of the cement and crystals were nearer, thus producing or maintaining a more intimate interweaving of the elements. In support of this theory might be cited the fact that without doubt nickel-iron alloys showed less tendency to segregation, which apparently showed that the combinations formed at high temperature were more intimately maintained when the alloy cooled and became solidified than was the case with ordinary steel.

NEWCASTLE SOCIETY OF ANTIQUARIES.—At the recent monthly meeting of the Society of Antiquaries of Newcastle-on-Tyne, Mr. Sherriton Holmes (treasurer), on behalf of Mr. G. B. Harris, presented to the Society "sundry plans, papers, and designs for the Newcastle Central buildings, which came from the office of the late Mr. Richard Grainger." Notes explanatory of the papers were read. Mr. Oswald, on behalf of the Northern Architectural Association, exhibited plans for courts of justice, with accommodation for judges and for the Mayor of the city, which Mr. Grainger had proposed to erect in Grey-street on the site now occupied by Messrs. Lambton's Bank. Mr. Dotchin presented a framed copy of the print of speeches delivered at the opening of the new markets in 1835. The Rev. Canon Greenwell, the Chairman, observed that Newcastle, through the whole of its career, had always possessed a number of great and eminent citizens, but to no one had the city been more indebted than to Richard Grainger. He was emphatically a man before his time, and his projects were all directed towards the making of a great and noble town. It was a most lamentable thing that his scheme for the erection of the proposed courts and public buildings was not carried out. The present Corporation buildings were of the meanest and most contemptible character, but he hoped to live to see them swept away and replaced by buildings more worthy of Newcastle. The name of the late Mr. Dobson had also come before them in connexion with that of Mr. Grainger. He was an architect of very great attainments and artistic faculties, and a man of whom Newcastle had reason to be proud. If he had been enabled to carry out in their entirety his designs for the Central Station, it would have been twice as fine a building as the present one. There, again, they had to lament the shortsightedness of a public body, for they were entitled to look upon the railway company as such, though it pleased the company on occasion to consider itself a private concern. The donors of the various exhibits were accorded the thanks of the meeting. A paper on "The Reopening of St. Cuthbert's Tomb in Durham Cathedral Church" was contributed by the Rev. E. J. Taylor, F.S.A., who described what took place on March 1, when the tomb of the saint was reopened.

CAPITAL AND LABOUR.

ABERDEEN MASONS. — The Aberdeen Master Masons' Association having considered the proposed compromise, namely, to grant an increase of ½d. per hour in the wages of the operatives all round, resolved to offer trowel men a rise from 8d. to 8½d. per hour, but to decline to increase hewers' wages, which are at present at the rate of 8d. per hour.

ABERDEEN PLUMBERS.—It has, after considerable negotiation, been agreed that the standard rate of wages for operatives be advanced from 7½d. to 8d. an hour, and that the radius for city work be increased from one and a half to two miles from Union Bridge. Beyond this area the extra rate of 6d. per day for suburban work will apply.

THE DARLINGTON BUILDING TRADE.—A meeting of the Darlington building trade, called by the branch of the Amalgamated Society of the Carpenters and Joiners, was held recently to consider the wages question. It was decided to give notice for an advance of ½d. per hour, such notice to expire on June 30. It was pointed out that two years ago application was made for an increase of 1d. per hour, but only ½d. was conceded, making the rate of wages 8d. per hour. It was thought, therefore, that they should now make application for the other ½d. It appears from statements made that Darlington is the least paid town in the county of Durham, Stockton being the nearest at 8¾d. per hour. At Middlesbrough the rate of wages is 9d., whilst on Tyneside it is 9½d.

BUILDING TRADE STRIKE AT LEICESTER.—The Leicester building trade is about to be completely paralysed by a general strike of bricklayers' labourers. In November the men gave notice of a demand for an advance of 1d. per hour to 7d., to commence on Saturday, on the ground that three years had elapsed since the previous advance, and that most of the Midland towns are paying the desired amount. But the employers refuse it, contending that only a dozen other towns are giving more than Leicester. The men refused to resume work on Wednesday.

BRICKLAYERS' STRIKE AT FELIXSTOWE. — About six months ago the Operative Bricklayers' Society gave notice to the master builders at Felixstowe of their request for one penny per hour rise in wages and a revision of working rules, on and after April 1. During the last few weeks a meeting between the Master Builders' Association and the Operative Bricklayers' Society has been held in Ipswich, but, as no agreement could then be arrived at, the matter was left over, and has not yet been decided. The men, therefore, came out on strike in the whole of the district on Saturday. The Felixstowe builders held a meeting at the Orwell Hotel on Saturday to consider the terms to be offered to the men now on strike, and who had demanded 1½d. per hour advance. The masters decided to offer ½d. per hour.

STRIKE AND LOCK-OUT AT SCARBOROUGH.—The secretary of the Labourers' Union recently wrote to Mr. Moore, a builder at Scarborough, notifying that unless a non-union labourer in his employ was discharged the union men would strike. The letter was referred to the Master Builders' Association, who informed the union that if Mr. Moore's men struck all the union labourers in Scarborough would be locked out. The men struck work on Wednesday.

LEGAL.

BUILDERS AND DRAINAGE.

LAST week, before his Honour Judge Edge and a jury, at Clerkenwell County Court, Thomas Wm. Kingsland, builder, Beechholme-road, High-road, Clapton, sued Maurice Miroy, agent, of Anson-road, Tufnell Park, for 52*l.* 5s., for work done and materials provided; and there was a counter-claim for 50*l.* damages alleged in respect of the plaintiff's negligent and defective execution of drainage work—viz., his omission to provide for the drainage of the cellars and basement at "Ellengowan," 40, Anson-road, Tufnell Park, and failure to lay drain pipes to the depth shown on the plan prepared by the plaintiff, approved by the defendant, and lodged with and passed by the Islington Vestry.

Mr. Whateley, barrister, appeared for the plaintiff, and Mr. Innes was counsel for the defendant.

It was stated that Mr. Miroy received notice from the Islington Vestry, specifying certain nuisances upon his premises which required remedying. The matter was put in the hands of Mr. Kingsland, who carried out a system of drainage. Previously, for no less than nine years the cellars, it was stated, had been perfectly dry; and it was submitted, on behalf of the defendant, that, after the execution of the work, the cellars were flooded after a downfall of rain to such an extent that it took two men six hours each to bale them out. Further, it was said, an outlay of 50*l.* would be required to put the cellar right again.

The jury retired at the close of the evidence, and found a verdict on the counter-claim for 52*l.* 10s., the plaintiff's claim being allowed by consent.

MEETINGS.

SATURDAY, APRIL 8.

Sanitary Inspectors' Association.—Mr. D. Balfour, M.Inst.C.E., on "Sewage Disposal by the various Methods up to date, viz.: Tidal, Land, Chemical, and Bacteriological." 6 p.m.

St. Paul's Ecclesiological Society.—Visit to the Dutch Church, Austin Friars (turning from Old Broad-street, E.C.). 3 p.m.

Edinburgh Architectural Association.—Visit to Woodhouselee.

MONDAY, APRIL 10.

Royal Institute of British Architects.—A paper to be read, arranged for by the Art Standing Committee, on "The Application of Colour to Interior Ornament in Relief." 8 p.m.

Society of Engineers.—Mr. E. C. Amos on "Machine Tools." 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. Edwin T. Hall on "Sanitary Building Construction." 8 p.m.

Bristol Society of Architects.—Mr. Herbert Singer on "Iron and Bronze Work."

TUESDAY, APRIL 11.

Institution of Civil Engineers.—(1) Paper to be further discussed: "Alloys of Iron and Nickel," by Mr. R. A. Hadfield. (2, time permitting) Mr. J. M. Dobson on "Buenos Ayres Harbour Works." 8 p.m.

Builders' Clerks' Benevolent Institution. — Annual dinner, King's Hall, Holborn Restaurant. 6 p.m.

Sheffield Society of Architects. — Annual meeting: Eelection of officers and council, &c.

WEDNESDAY, APRIL 12.

Sanitary Institute.—Miss Alice Ravenhill on "Practical Hygiene Teaching in Elementary Schools." 8 p.m.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection at Disinfecting Station, Lot's-road, Chelsea. 3 p.m.

Society of Arts.—Mr. John Gavey on "Telephones." 8 p.m.

Liverpool Engineering Society.—Mr. Malcolm Blair on "The Difficulties that Manufacturing Engineers have to Undergo in Estimating and Working to Civil Engineers' Specifications." 8 p.m.

Edinburgh Architectural Society.—Mr. J. Fairweather on "Minor Points in Practice." 8 p.m.

THURSDAY, APRIL 13.

Royal Institution.—Professor Dewar on "The Atmosphere." I. 3 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. W. C. Tyndale on "House Drainage." 8 p.m.

Institution of Electrical Engineers.—(1) "The Hissing of the Electric Arc," by Mrs. Ayrton (conclusion of discussion). (2) "Experiments on Alternate Current Arcs by aid of Oscillographs," by Messrs. W. Duddell and E. W. Marchant (discussion, to be opened by the authors with an exhibition of experiments). 8 p.m.

Society of Antiquaries.—8.30 p.m.

Society for the Encouragement of the Fine Arts.—Mrs. Philip H. Newman on "Some Goldsmiths and their Work."

FRIDAY, APRIL 14.

Architectural Association.—Mr. F. W. Pomeroy on "Modelling as Applied to Architecture," with practical demonstrations. 7.30 p.m.

Royal Institution.—Professor A. W. Rücker on "Earth Currents and Electric Traction." 9 p.m.

Institution of Junior Engineers (Westminster Palace Hotel).—Paper to be read and discussed: "Piles and Pile-driving," by Mr. H. C. Reid. 8 p.m.

SATURDAY, APRIL 15.

Institution of Junior Engineers.—Visit to the works of the new Vauxhall Bridge. 3 p.m.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection at Beddington Sewage Farm. 3 p.m.

Perth Architectural Association.—Visit to Free Middle Church, Tay-street. 2.30 p.m.

RECENT PATENTS:

ACCEPTED SPECIFICATIONS.

Open to Opposition until May 29.

[1898] 4,133, Usill & Browne, Apparatus for the Graphic Demonstration of Trigonometry. 6,695, Crompton & Ashley, Electrical Measuring Apparatus for Use in Regulating Currents. 6,788, Kirtley, Pipe Joints. 6,903, Tanner & Lowcock, Electrical Plug Connectors. 7,237, Richmond, Gas-heated Water Heaters or Boilers. 7,268, Geiser, Instrument for Ascertaining the Radius or the Centre of a Circle to which the Sides of an Angle are Tangential. 7,798, Nunns, 19,972, Hooper, and [1899] 2,325, Fürer, Electrical Switches. 7,965, Macdonald, Smoke Testing and Fumigating Appliances for Drains, &c. 8,764, Jones, Miners' Safety Lamps. 9,174, Stanley, Mining Surveying Instruments. 9,210, Winter, Stove Regulator. 9,280, Pease, Structural Arrangements for Combining Strength with Rigidity for Roofing, Walling, and similar Structural Purposes. 9,319, Javal, Production of Acetylene Gas. 9,450, Morgan, Air-inlet for the Ventilation of Sewers. 9,888, Barger, Thresholds and Weather Strips therefor. 10,556, Boydell, Gulleys and Traps for Streets and Similar Places. 10,684, Barltrop, Acetylene Lamps. 10,814, Hepburn, Vegetable Glues or Sizings. 10,908, Kien, Window Sashes. 11,172, Lacombe, Telemetrical Telescopes or Telemeters. 11,347, Bohle, Registering Apparatus for Use with Cranes, Lifts, &c. 11,397, Törner, Oil Stoves, &c. 11,573, Glover & Glover, Means for Increasing the Initial Velocity of Bunsen Flames for Heating, Soldering, Brazing, and other useful purposes. 11,673, Killip, Ladders. 11,750, Willocks, Disinfectants and their use. 11,929, Bull, Beam Compasses. 12,047, Cordeaux, Wheelbarrows and Handcarts. 12,254, Sjöstrand, Instrument for Reproducing Drawings. 12,552, J. Duckett & Son, Ltd., and Duckett, Water-closets. 14,184, Stamm, Material for Impregnating Incandescent Mantles. 16,552-3, Bremer, Electrodes for Arc Lamps, and Electrical Arc Lamps. 21,044, Cox, Prepayment Electrical Motors and Meters. 24,293, Goodson, Gas Governors. 24,849, Moore, Burial Caskets. 26,785, Brockie, Automatical Lathes. [1899] 334, Rigby & Taylor, Automatical Opening, Closing, Locking, and Unlocking the Doors of Hoists, Lifts, &c. 1,028, Shaw, Tumbler Locks. 1,683, Melzer, Haffner, & Koch, and 2,971, Bagley, Arc Lamps. 1,745, Ross, Composition for Flooring, Roofing, &c. 2,056, Brown, Chimney and Ventilating Shaft Tops. 2,449, Caro & Saulmann, Incandescent Mantles. 2,460, Steinhoff, Gas or Oil Heaters or Stoves. 2,719, Davis and others, Method of, and Apparatus for Applying Paint, Lacquer, and other Coatings. 2,733, Marchand, Oval-cutting Machine. 2,764, Lapp, Deepboring Apparatus. 2,862, McKenna, Straightening and Cutting Rails, &c. 2,997, Hutcheson, Gulley Traps or Cesspools. 3,231, Walsh, Means for Opening Windows in Case of Fire or Emergency. 3,468, Palazzi, Blow-pipe Lamps. 3,630, Legge, Means of Attachment between the Knobs and Bolts of Night Latches and other Drawback Latches. 3,785, Stewart, Wrenches or Spanners. 3,973, Kimber, Machines for Sharpening Rock-drills, Rock-drilling Machine Bits, &c. 4,074, Geary, Manufacture of Wood-block and Parquet Flooring.

ABSTRACTS OF PATENTED INVENTIONS.

27,616.—JOINERS' CRAMPS AND BENCH FITTINGS: *H. White.*—The invention relates to means for securing window-sashes and similar woodwork to a joiner's bench, a wooden block is secured by bolts to the bench, and sliding bars, which can be locked in position with screws, carry other screws which secure the sash-frame's lower member, whilst the frame's top bar is held by screws which pass through nuts attached to the bench.

27,632.—AN APPLIANCE FOR WINDOWS: *J. W. Merry.*—To carry off water arising from condensation, troughs, made of bent sheet-metal are fastened to the inside of the window's bottom rail, the trough's edge has a V-shaped groove in the rail, and the moisture is drained from the trough through holes in the sash-bar.

27,639.—CALCIUM CARBIDE: *W. J. H. Lazarus.*—Calcium carbide, to be used for making acetylene gas, is made in the shape of cartridges, for convenience of packing and transport; lumps of raw carbide are first impregnated with from five to twenty-five per cent. of paraffin, stearine wax, and similar substances, then ground into a powder, the powder is pressed into metal containers which are closed at one end with a damp-proof material which is also rendered insoluble with formaldehyde or potassium bichromate. It is claimed that the impregnating material and the calcium hydroxide form a pasty mass which keeps the carbide dry when it is taken out of the water, but allows water to soak through it, and acetylene to easily escape, when it is immersed.

27,652.—GAS IGNITION: *M. Bernstein.*—Certain fibres, filaments, or other combustible organic materials, combined with various inorganic substances (such as calcium, barium, strontium, aluminium, beryllium, erbium, thorium, and so on), are saturated with a solution of palladium or platinum, or of both, and then incinerated; the gas is automatically lighted by means of the palladium or platinum black, which is placed, in its finely-divided state, within a porous support.

27,698.—SCREW WALL-SOCKETS: *C. Udall & F. H. Royce & Co.*—The inventors' object is to facilitate the finding of the place where the hole must be made in the wood-casing (for telephone wires, &c.); to that end a sharply pointed loose plug is inserted within the metal screw socket after the latter has been driven into the wall, and the casing is then placed against it in position; or sharp points may be formed upon the edge of the socket.

27,720.—GAS NOZZLE VALVES: *M. Seiler.*—A valve for regulating the flow of the gas is provided underneath the outlet of the nozzle of a Bunsen or similar burner, after the kind used for incandescent lights. The valve has a narrow rib which, when disposed slantwise, causes two gas currents to flow out at various distances from the top of the nozzle, whereby a complete expansion of the gas and mixing thereof with the air are ensured.

27,727.—WATER WASTE PREVENTERS: *T. & J. H. Claughton.*—The starting lever is mounted upon a removable stud by means of bearings upon a bridge piece, which is bolted at its either end to the top of the tank. There are stops—or set screws may be substituted—for regulating the stroke of the lever.

27,767.—GENERATION OF ACETYLENE GAS: *J. H. Schülke.*—Perforated carbide holders are placed within floating vessels, each of which is covered with a bell attached thereto by springs; a pipe on the bells covers another pipe through which the gas passes to a common pipe beneath, and thence through a condensing coil into the holder, and so to a pressure regulator and to the service pipes; each of the floating vessels has a hole for the passage of water to a perforated pipe that conveys the water to the bottom of the vessel, thus the carbide is operated upon from beneath it, and the upper layers of carbide dry the gas; a reduction of gas pressure gives the water access to the lowest hole, whilst an excess of pressure lifts the bell and carbide holder, and so arrests generation of gas; after the first vessel is exhausted all the vessels fall until the next vessel comes into play.

27,813.—LAVATORY SUPPLY AND OTHER FITTINGS: *J. Shanks.*—The basin has an extension to be built into the supporting wall, a conical-headed bolt, wedged into a recess, secures to the basin a bracket which carries the discharge pipe: for discharge, a conical recess, formed at the bottom of the basin, is fitted with a heavy valve having a rubber flange, the valve-stem passes up through a grating fastened by screws that engage with the heads of the bolts which secure the flange of the discharge pipe; the water passes from the hot-and-cold mixing chamber either directly into the basin, or to an overhead spray, provision being made for stopping the one form of supply when the other is required, as well as for a single jet or a spray delivery.

27,817.—MOULDING TILES: *A. Roberts, E. T. Ball, & W. H. Bangham.*—Dove-tail slides form under-cut recesses in the tile, being forced outwards by stationary wedges, when pressure upon the plastic material within the mould forces the die plate downwards; springs force the slides together when the die plate rises upon removal of the pressure.

27,860.—MAN-HOLES FOR SEWERS: *H. E. Stilgoe.*—The bottoms or inverts of the man-holes, cast in one piece or more, extend above the subsoil water level, the ends of each invert are bolted to the pocketed flanged ends of the sewer pipes, and have channels and pockets, the invert may be bedded upon concrete, and the pockets may be filled with cement when the joints are made, branch pipes can be similarly fitted to the bottom.

27,884.—FIREPROOF AND WATERPROOF ROOFS.—*R. Glendinning.*—When a flooring has been nailed to the rafters, arranged approximately horizontally, a number of layers of overlapping sheets of asphalt are applied in turn with an adhesive compound of pitch, tar, resin and Trinidad asphalt. The surface is then coated with the compound, to which gravel, stone chippings, sand, &c., may be added, or a layer of cement instead. The roofing may be laid on stone, concrete, or other surfaces.

28,055.—EXTINGUISHING FIRE: *C. B. Shaw.*—For a sprinkler nozzle, with valve, distributor, and so on, volatile liquid is poured into an expansible chamber, which, when sufficiently heated, expands and forces a key or plate outwards, and releases a block attached to the head of a strut, whereupon the compound strut collapses, and, opening a valve, allows a jet of water to be discharged against a toothed spreader.

28,140.—TIES FOR SCAFFOLDING POLES: *W. & A. Hunnable.*—In one shape, a forked bracket, having two pivotted hooks, is secured to an upright pole by means of a spiked band and chain, and supports a horizontal pole, the bracket knuckles bear against the upright pole to form a lever fulcrum, whilst the weight of the staging forces spikes into the pole; in another form, two segmental bands are pivotted together and joined to a chain by a screwed hook and a hook; a nut on the screwed hook tightens the bands and chain round the pole, and a segmental socket, fixed upon the band, supports a horizontal or inclined pole.

28,179.—FLUSHING VALVES: *J. G. Connell.*—In order to provide a flush and after flush, a hollow sealed valve works within an inverted cup, perforated at its sides, which slides in the valve-body; the cup and valve-body are normally full of water discharged when the stem lifts the collar from its seat, continued motion lifts the valve to the cup's top, and the cup to the valve-body's top, when a flush ensues; when the stem is left free the cup falls down to its seat, and then the valve falls, the rate at which water enters the valve and cup determining the time of closure.

28,246.—ELECTRICAL CUT-OUTS: *H. C. Gover & W. Müller.*—Slots for receiving sliding inverted T-pieces which carry the terminals are formed in the base of the instrument. The wires are secured with screws, and the fuse-wire is threaded through a tunnel and fastened with screws. Slots are cut in the screw thread and communicate with a groove, which also is in communication with the exterior.

28,289.—SASH FASTENINGS: *C. Russom.*—On the arm of an ordinary fastener is a spring knob, and on the knob is a pin that holds the arm in a locking position by engagement with a plate on the inner meeting rail. When the knob is raised and the arm is turned (to unfasten the sashes) the knob is turned relatively to the socket, whereupon a lug on the knob passes out of a notch in the socket, holding the knob raised until the sashes are fastened again.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

March 22.—By SIMMONS & SONS (at Basingstoke).

Wootton St. Lawrence, Hants.—Upper Wootton Farm, 413a. 1r., f. £10,000

By HEPPER & SONS (at Bramley).

Bramley, Yorks.—The Green Hill House Estate, 46a. 2r. 30p., f. (in lots)..... 5,820

March 23.—By BAXTER, PAYNE, & LEPPER (at Bromley).

Bromley, Kent.—30, High-st., f., e.r. 60*l.*..... 800

By W. MARTIN & CO.

Hampton, Middx.—Hanworth-rd., Glenthorne, u.t. 83 yrs., g.r. 12*l.* 10s., r. 35*l.* 220

Dulwich.—88, Melbourne-grove, u.t. 77 yrs., g.r. 6*l.* 10s. 275

46, Ashbourne-grove, u.t. 71 yrs., g.r. 6*l.*, r. 28*l.* 310

2A and 2, Chesterfield-grove, u.t. 71 yrs., g.r. 7*l.* 10s. 450

By C. C. & T. MOORE.

Stepney.—60, Heath-st., f., r. 26*l.* 320

26, Smith-st., u.t. 14½ yrs., g.r. 2*l.* 10s., r. 30*l.*... 165

31, Stepney-causeway, f..... 535

Limehouse.—33, Church-row, f., r. 26*l.* 400

80, 82, and 84, Salmon-lane, c., r. 74*l.* 8s. 825

40, 41, 42, 43, and 44, Dalgleish-st., c. 1,160

Hackney.—222, Mare-st., f. 2,720

1, Darnley-rd., f., e.r. 55*l.* 800

By NEWBON, EDWARDS, & SHEPHARD.

Brixton.—Brandon-rd., f.g.r. 12*l.*, reversion in 56 yrs. 330

Harringay.—12, 14, and 16, Umfreville-rd., f., r. 107*l.* 1,775

By W. STEVENS.

Hackney.—35, Rendlesham-rd., f., r. 30*l.*..... 485

Stoke Newington.—68, Newington Green-rd., u.t. 52½ yrs., g.r. 4*l.*, e.r. 36*l.*..... 370

De Beauvoir Town.—31, Church-rd., u.t. 19½ yrs., g.r. 7s., e.r. 42*l.*..... 325

Ball's Pond.—21 and 23, Kingsbury-rd., u.t. 53 yrs., g.r. 12*l.* 12s., r. 76*l.*..... £700

Tottenham.—268 and 270, St. Ann's-rd., u.t. 60 yrs., g.r. 8*l.*..... 320

By DRIVERS (Holloway).

Finsbury Park.—23, 25, 27, and 31, Alexandra-rd., u.t. 59 yrs., g.r. 50*l.* 8s., e.r. 178*l.*..... 1,720

3, 10, 17, and 12, Alexandra-rd., u.t. 74½ yrs., g.r. 50*l.* 8s., r. 196*l.* 1,750

37, Gloucester-rd., u.t. 60 yrs., g.r. 13*l.* 13s., r. 65*l.*..... 715

Stamford Hill.—133, St. Ann's-rd., f., r. 32*l.*..... 505

Holloway.—A reversionary lease to the front portion of 44, Seven Sisters'-rd., expectant in 1905, for a term of 61 yrs..... 255

By STIMSON & SONS.

Catford.—1 to 5, Balmoral-ter., f., r. 175*l.*..... 2,000

Brixton.—131, Acre-lane, u.t. 24 yrs., g.r. nil, e.r. 55*l.*..... 415

Camberwell.—1 to 4, Rust's-sq., u.t. 59 yrs., g.r. 25*l.* 4s. 1,370

Walworth.—52, Olney-st., u.t. 16½ yrs., g.r. 4*l.* 10s., r. 34*l.*..... 185

Charlton, Kent.—61 and 63, Maryon-rd., u.t. 23½ yrs., g.r. 14*l.*, e.r. 91*l.* 310

Kennington.—67, St. Agnes-pl., u.t. 69 yrs., g.r. 6*l.* 6s., r. 40*l.* 425

2, Hanover-gdns., u.t. 46 yrs., g.r. 7*l.* 4s., r. 34*l.* 340

Dulwich.—291 to 303 (odd), 307, 309, and 315, Underhill-rd., f..... 4,285

Landells-rd., a plot of land with buildings thereon, f., r. 40*l.*..... 550

By BOYTON, PEGRAM, & BUCKMASTER (at Walham Green).

Fulham.—2a, 4a, 37, 39, 43, 45, 47, 61 to 71 (odd), Burnfoot-av., u.t. 92 yrs., g.r. 54*l.*, r. 443*l.* 18s. (in lots) 4,345

53, Waldemar-av., u.t. 86 yrs., g.r. 6*l.* 10s., e.r. 40*l.*..... 335

March 24.—By A. G. OLLEY (at Walham Green).

Fulham.—50, 75, and 77, Horder-rd., f..... 1,000

32, Waterford-rd., u.t. 60½ yrs., g.r. 6*l.*, r. 32*l.*... 305

Wandsworth.—31, Lebanon-gardens, u.t. 78½ yrs., g.r. 6*l.* 10s., r. 28*l.*..... 300

By HENRY HENDRIKS (at Birmingham).

Perry Barr, Staffs.—39 to 49 (odd), Aston-lane, u.t. 75 yrs., g.r. 9*l.* 8s. 2d., r. 117*l.* 1,600

Small Heath, Worcs.—223, Green-Lane, f., r. 24*l.* 340

Birmingham, Warwick.—65 to 73 (odd), Goodrick-st., u.t. 93 yrs., g.r. 12*l.* 10s. 785

By WALTER HALL.

South Norwood.—Lincoln-rd., f.g.r. 72*l.*, reversion in 79 yrs. 1,940

Willesden.—Cooper-rd., f.g.r. 53*l.* 11s., reversion in 91 yrs. 1,490

Brownlow-rd., f.g.r. 13*l.*, reversion in 86 yrs. .. 370

By HERRING, SON, & DAW.

Brixton.—38, St. James'-rd., u.t. 24 yrs., g.r. 10*l.* 10s. 900

By A. J. SHEFFIELD.

Hastings.—2, White Rock-gardens, u.t. 79 yrs., g.r. 20*l.*, r. 130*l.* 1,500

Upton Pk.—101 and 103, Neville-rd., f..... 630

Canning Town.—32 and 34, Seaton-st., u.t. 68 yrs., g.r. 5*l.*..... 150

59 and 61, Vincent-st., u.t. 66 yrs., g.r. 7*l.*..... 115

12, 14, and 16, Outram-st., u.t. 68 yrs., g.r. 7*l.* 10s. 135

By T. B. WESTACOTT.

St. Pancras.—17 and 19, Leigh-st., u.t. 7½ yrs., g.r. 42*l.*..... 180

31, 32, and 33, Sandwich-st., u.t. 7½ yrs., g.r. 25*l.* 4s. 235

Camden Town.—19, Chalk Farm-rd., u.t. 31½ yrs., g.r. 10*l.*, r. 80*l.* 940

By STIMSON & SONS.

South Lambeth.—Fentiman-rd., f.g.r.'s 32*l.* 10s., reversion in 26½ yrs. 1,345

Claylands-rd., f.g.r.'s 85*l.* 10s., reversions in 24½, 24½, and 25½ yrs. 4,520

Church-st., f.g.r. 16*l.*, reversion in 24½ yrs. 705

Meadow-rd., f.g.r. 10*l.* 10s., reversion in 20½ yrs. 605

Hartington-rd., f.g.r.'s 15*l.* 10s., reversion in 61 yrs..... 490

Brixton.—Horsford-rd., f.g.r. 19*l.*, reversion in 77 yrs. 565

Camberwell.—Denmark Hill, f.g.r.'s 26*l.*, reversion in 63 yrs. 745

Daneville-rd., f.g.r.'s 19*l.* 5s., reversion in 63 yrs. 590

Cuthill-rd., f.g.r. 22*l.*, reversion in 63 yrs..... 685

Stoke Newington.—Allen-rd., f.g.r. 5*l.*, reversion in 61 yrs. 140

Paddington.—Grittleton-rd., &c., i.g.r. 104*l.*, u.t. 64 yrs., g.r. 2*l.*..... 2,060

South Lambeth.—Fentiman-rd., i.g.r. 60*l.*, u.t. 39 64 yrs., g.r. 8*l.*..... 815

Richmond-ter., i.g.r. 45*l.*, u.t. 29½ yrs., g.r. 6*l.* 515

Richmond-ter., i.g.r. 68*l.*, u.t. 39 yrs., g.r. 8*l.* .. 915

Meadow-rd., &c., i.g.r. 34*l.*, u.t. 39 yrs., g.r. 5*l.* 460

Kennington.—14, Kennington Pk.-rd., c., r. 62*l.* 620

South Lambeth.—100 and 102, Fentiman-rd., f., r. 100*l.*..... 2,240

Kennington.—13, 13A, and 15, Lower Kennington-lane, f. 1,685

17, Lower Kennington-lane, area 2,934 ft., f., r. 60*l.*..... 1,230

Hounslow.—Grosvenor-rd., a plot of building land, f. 320

Wellington-rd. North, two houses and shops, with land and stabling adjoining, u.t. 61½ yrs., g.r. 10*l.*, r. 48*l.* 640

Chiswick.—28 and 30, Cambridge-rd., u.t. 62 yrs., g.r. 6*l.*, r. 61*l.*..... 600

48 and 50, Cambridge-rd., u.t. 67½ yrs., g.r. 12*l.*, r. 70*l.*..... 600

South Lambeth.—27 and 29, Claylands-rd., u.t. 24½ yrs., g.r. 7*l.* 12s., r. 72*l.* 510

30 to 48 (even), Claylands-rd., with stabling, &c., adjoining, u.t. 24 yrs., g.r. 67*l.*, r. 367*l.* 2,000

21 and 57, Trigon-rd., u.t. 25½ yrs., g.r. 9*l.* 10s., r. 70*l.*..... 515

Battersea.—303 and 305, York-rd., with timber-yard in rear, u.t. 38 yrs., g.r. 5*l.*, r. 58*l.* 10s... 750

March 25.—By J. Carter Jonas & Sons (at Wisbech).

Wisbech, Cambs.—The Leverington Estate, 240 acres, f..... 14,000

March 27.—By NOKES & NOKES.

Tottenham.—1 and 3, High Cross-rd., u.t. 81 yrs., g.r. 12*l.*..... 445

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*Laying-out Site of Barracks	Salford Corp.	30*l.*; 20*l.*; and 10*l.*	May 9
*Public Baths	Fulham Baths Comrs.	150; 75; and 50 guineas premiums	No date

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Road Metal	Staffs. C.C.	J. Moncur, Surv. County Buildings, Stafford	April 11
Alterations to Club House	Annan (N.B.) Conservative Association	F. J. C. Carruthers, Archt. Dumfries	do.
Houses, Craigievar Estate, Aberdeen	.....	A. Stronach, Junr. 20, Belmont-st. Aberdeen	do.
Granite	Lutterworth R.D.C.	J. C. Coates, Surv. Bitteswell, Lutterworth	do.
Boundary Wall, &c. Northcote-lane	Cardiff Corp.	W. Harpur, C.E. Town Hall	do.
Additions to Grammar School, Wigton	.....	J. Graham, Archt. Bank-st. Carlisle	do.
Paving Alexandra road	Bedford Corp.	Boro Surv. Town Hall	do.
Five Houses, Linthwaite, Huddersfield	G. Haigh	J. Berry, Archt. 9, Queen-st. Huddersfield	do.
*10-ton Steam Road Roller	Cty. Boro. West Ham	Lewis Angell, Town Hall, Stratford	do.
*Clinker Mill and a Mortar Mill	Poplar B. of W.	The Surveyor, 117, High-st. Poplar, E	do.
*Road Making and Paving	Hammersmith Vestry	H. Mair, Town Hall, Hammersmith, W.	April 12
Malting, Frome	E. Baily & Son, Ltd.	W. G. Brown, Archt. Parkrd. Frome	do.
Mortuary, Tividale	Rowley Regis U.D.C.	D. Wright, Council Offices, Old Hill, Staffs.	do.
Twelve Houses and Shop, Agnes-road, Barnsley		Wade & Turner, Archts. 10, Pitt-st. Barnsley	do.
House and Shop, Winchester-street, Salisbury	Municipal Charities Trustees	J. Harding & Son, Archt. Salisbury	do.
Alterations to Station, Clegg-street, Oldham		Engineer, London-road Station, Manchester	do.
Sewers	Rawtenstall (Lancs.) Corp.	A. W. Lawson, C.E. Municipal Offices	do.
Sixteen Houses, Gibbet-lane, Halifax	Halifax Indus. Soc. Ltd.	W. C. Williams, Archt. 29, Southgate, Halifax	do.
Roads, Southwold, Suffolk	Coast Development Co. Ltd.	H. Miller, 16, Museum-st. Ipswich	do.
Sewerage Works	Brightlingsea (Essex) U.D.C.	J. J. Taylor, 1, Victoria-st. Westminster, S.W.	do.
*Constructing and Sinking Well	Rochford R.D.C.	J. Mansergh, 5, Victoria-st. S.W.	April 13
House, Skegness, Lincs.	.....	J. Green, 25, Lumley-rd. Skegness	do.
House, Lindale-in-Cartmell	.....	J. Stalker, Archt. 57, Highgate, Kendal	do.
Granite Setts (3,000 tons)	Blackburn Corp.	W. Stubbs, C.E. Municipal Offices	do.
Additions to Workhouse	Ipswich Union	A. F. Vultiamy, Union Offices, Tower-st.	do.
Rebuilding Forester's Arms Inn, Gateshead	R. Newton	A. G. Kyle, Archt. 145, Pilgrim-st. Newcastle-on-Tyne	do.
*Painting at Schools	St. George's in the East Guardians	G. A. Wilson, Vestry Hall, Cable-st. E.	April 14
*Converting Lifts to Hydraulic Lifts	do.	do.	do.
*Wood Paving and Concrete Foundations	Brighton Corp.	F. J. C. May, Town Hall	do.
School, &c. Botcherby, Carlisle	St. Cuthbert Without Sch. Bd.	A. W. Johnston, Archt. 81 Castle-st Carlisle	do.
Paving Works, Miller-road	Preston Corp.	Borough Engr. Town Hall, Preston	do.
*Alterations and Additions to Factory	B. Morris & Sons, Ltd.	C. Stranger & Sons, 21, Finsbury-pavement, E.C.	do.
Forty Houses, Aber, Bargoed	Powell Duffryn Steam Coal Co. Ltd.	E. M. Ham, Aberaman, Aberdare	April 15
Additions to St. George Hotel, Aberystwyth	Allsopp & Sons	Hipkiss & Bassett, Archts. Terrace-rd. Aberystwyth	do.
Alterations to Police Station, Lanchester	Durham Standing Joint Committee	W. Crozier, C.E. Shire Hall, Durham	do.
House and Forge, Westgate, Halifax	.....	C. F. L. Horsfall & Son, Archts. Halifax	do.
Additions to Union Offices	Hunslet Union	W. E. Richardson, Archt. Bond-st Leeds	April 17
Additions to Forest Hospital, Mansfield	.....	R. F. Vallance, Boro Surv. Town Hall	do.
Piers, Abutments, &c. Ashton	Bristol Corp.	Engr. Cumberland-basin, Bristol	do.
Drainage Works, &c. Main-street	Cockermouth U.D.C.	J. Fearon, Council Offices, Cockermouth	do.
Flint Road Metal	Henley R.D.C.	C. Harper, Surv. Cane End, Reading	do.
*Concrete, &c. Tank and Filter Bed, Laying Pipes, &c.	Chayader R.D.C.	G. M. Jarman, Council Offices, Rhayader	April 18
Police Station, St. Andrew's-st.	Cambridge T.C.	J. Morley, Archt. 22, St. Andrew's-st. Cambridge	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Stables, Cardiff	G. W. Ry. Co.	G. K. Mills, Paddington Station, W.	
*Stone Paving	Tottenham U.D.C.	P. E. Murphy, 712, High-rd. Tottenham	April 18
*Sluice Valve Hydrants	do.	do.	do.
*Brick and Pipe Sewers	do.	do.	do.
*Road Making	Brentford U.D.C.	do.	do.
School and House, Johnstown	Ruabon (U.D.) Sch. Bd	Nowell Parr, Clifden House Boston-road, Brentford	do.
Schools, Llanfyllin, Wales	.....	J. Morison & Son, Archt. King-st. Wrexham	April 19
Hospital and Dispensary, Abergavenny	.....	H. Teather, Archt. 83, Wyle-cop, Shrewsbury	April 20
Bridge, Aireworth	Keighley Corp.	E. A. Johnson, Archt. Abergavenny	do.
Additions, St. John's Church, Golcar	.....	W. H. Hopkinson, C.E. Town Hall	do.
*Iron Arched Roof	Newcastle-on-Tyne Corp.	J. Kirk & Sons, Archts Huddersfield	do.
*Two Shops, Melksham	Henry White	Town Hall	do.
Hospital, &c. Chinley, Chapel-en-le-Frith	High Peak Hospital Committee	H. Brakspear, High-st. Corsham, Wilts	April 22
Three Cottages, Bexhill	East Sussex C.C.	W. R. Bryden, Archt. 1, George-st. Buxton	do.
Sewers, Croston	.....	F. J. Wood, C.E. County Hall. Lewes	do.
*Public Library	Croydon and Lambeth Joint Libraries	F. E. Dixon, C.E. 49, Lune st Preston	April 24
Additions to Gasworks	Oldham Corp.	E. Haslehurst, 7A, Lawrence Pountney Hill, E.C.	do.
*Enlargement of Workshop at School	Walthamstow Sch. Bd.	A. Andrew, Gas Offices, Greaves-st	April 25
*Alterations Boiler and Engine House, and Erecting Chimney Shaft	Metropolitan Asylums Bd.	W. A. Longmore, Bridge Chambers, Hue-street, Walthamstow	do.
*Enlarging School Premises	Weybourne (U.D.) Sch. Bd.	Office, Norfolk House, Norfolk-st. Strand, W.C.	April 26
*Erecting School and Alterations to a Building	Barrow-in-Furness Corp.	F. Andrews, Offices, Holt, Norfolk	April 27
Schools, Sunnyside	Halifax Sch. Bd.	Boro. Engineer	April 28
Substructure of Bridge over River Avon, Breamore	Hants C.C.	W. C. Williams, Archt. 29 Southgate, Halifax	April 29
*Removal and Reconstruction of Bridge	Paddington Vestry	W. J. Taylor, County Surv. The Castle, Winchester	May 1
*Naval Reserve Buildings, Altcar, nr. Liverpool	Admiralty	G. Weston, Vestry Hall, Harrow-rd. W.	do.
*Villa	.....	Director of Works, 21, Northumberland-av. W.C	May 5
Houses and Shop, Hill-town, Bolsover	.....	G. Dirgley, 69, Coleman-st. E.C.	No date
Additions to Imperial Hotel, Exmouth	H. W. Hayward	Vallance & Westwick, Archts. White Hart-chambers, Mansfield	do.
High Chimney, Brigg Mills, Meltham, nr. Huddersfield	Meltham Spinning Co. Ltd.	P. Kerley, Archt. Exmouth	do.
Chimney Shaft, Boiler House, &c.	Newhaven & Seaford Water Co.	W. Carter, Archt. Meltham	do.
Additions to Stores, Scotswood	Blaydon Co-op. Soc.	H. C. Card, Surv. 10, North-st. Lewes	do.
Sixteen Houses, Ravennook, Carlisle	J. Graham	W. Glover, Archt. 16, Market-st. Newcastle-on-Tyne	do.
Additions to Business Premises, Leeds-road, Bradford	.....	J. & J. W. Hayton, Surv. Bank-st. Carlisle	do.
Additions to Schools, Clowbridge, nr Burnley	.....	Empsall & Clarkson, Archts. 7, Exchange, Bradford	do.
Additions to Business Premises, High-street, Dudley	.....	T. Bell, Archt. 14, Grimshawe-st. Burnley	do.
Ten Cottages, Greenhead Station Carlisle	.....	A. Ramsell, Archt. 7, Priory-st. Dudley	do.
Additions to Laundry Buildings	Carlisle Steam Laundry Co.	Thompson & Sons, Kirkhouse, Brampton Juncn. Cumberland	do.
Eight Houses, Harehills, Leeds	.....	Johnstone Bros. Archt. 39, Lowther-st. Carlisle	do.
Block of Cottages, Ilkley	.....	J. W. Watson, 21, New Station-st. Leeds	do.
Business Premises, Hereford	King & Sons	Isitt & Co. Archts. Prudential-buildings, Bradford	do.
*New Roofs, &c. at Church	.....	W. W. Robinson, Archt. 10, King-st. Hereford	do.
		Messrs. Chancellor, Archt. Chelmsford	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in.
*Architectural Draughtsman (2)	Scarboro. Corp.	.....	April 10
*Assistant Surveyor	Margate Corp.	150*l.* per annum	do.
*Surveyor's Assistant	Hammersmith Vestry	150*l.* per annum	April 12
*Clerk of Works	Hastings Union	4*l.* 4s. per week	April 13
*Architectural Assistant	West Bromwich Corp.	100*l.* rising to 120*l.* per ann.	April 15
*Building Inspector	Tottenham U.D.C.	150*l.* per annum	April 17

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p.* iv. *Contracts, pp.* iv. vi. viii. x. & xxii. *Public Appointments, pp.* xix. & xxii.

1, Lincoln-rd., u.t. 79 yrs., g.r. 6*l.* 10s. £245
Holloway.—47 and 49, Hampden-rd., u.t. 48 yrs., g.r. 10*l.* 400

By E. PENNINGTON.

Teddington.—Twickenham-rd., two plots of land, f. 350
Twickenham-rd., &c., Cranley and Lyddisdale, f., e.r., 140*l.* 2,250

By PRICKETT & ELLIS.

Kew Bridge.—Station-ter., f.g.r., 44*l.*, reversion in 76 yrs. 1,360

By W. W. SAUNDERS.

Brixton.—11, Barrington-rd., u.t. 24 yrs., g.r. 8*l.*, r. 50*l.* 445

March 28.—By BEALE & CAPPS.

North Kensington.—77 and 81, St. Quintin-av., u.t. 80 yrs., g.r. 20*l.*, r. 105*l.* 915

By DOLMAN & PEARCE.

Hampstead.—51 and 53, England's-lane, u.t. 66 yrs., g.r. 4*l.*, r. 160*l.* 2,410

By SAUNDERS & SON.

St. John's Wood.—1, St. Ann's-ter., u.t., 20½ yrs., g.r. 6*l.*, r. 50*l.* 385

By DEBENHAM, TEWSON, & CO.

South Kensington.—19, 21, and 23, Lexham-gardens, u.t. 73 yrs., g.r. 45*l.* 3,400
Chislehurst Hill, Kent.—The Mount, u.t. 87 yrs., g.r. 25*l.* 600
4 and 5, Summer Hill-villas, f. 2,650

Herne Hill.—26, Norwood-rd., u.t. 59 yrs., g.r. 16*l.* 16s., r. 50*l.* £500
Chiswick.—4, 12, 18, 40, and 42, Devonshire-rd., u.t. 80 yrs., g.r. 38*l.* 2s. 6d., r. 186*l.* 1,940
Sydenham.—6 and 7, Border-cres., u.t. 84 yrs., g.r. 70*l.* 1,100
Brixton.—74, Elm Park, u.t. 77 yrs., g.r. 7*l.* 10s., r. 30*l.* 400

By FLEURET, SONS, & ADAMS (at Masons' Hall Tavern).

Poplar.—Cotall-st., "The Prince of Wales" p.-h., u.t. 44 yrs., g.r. 35*l.*, r. 100*l.* 1,250

March 29.—By FORTESCUE & CO.

Wandsworth.—3 and 5, East Hill, f., r. 82*l.* 1,360
19 and 21, Tonsley Hill, u.t. 63 yrs., g.r. 8*l.*, r. 50*l.* 10s. 405
31, Tonsley Hill, and 29, Tonsley-pl., u.t. 63 yrs., g.r. 8*l.*, r. 46*l.* 435
Fulham.—39, Bishop's-rd., u.t. 91 yrs., g.r. 6*l.* 6s., r. 34*l.* 400

By HARMAN BROS.

King's Cross.—15, Tiber-st., u.t. 43 yrs., g.r. 4*l.* 245
De Beauvoir Town.—196 and 198, Southgate-rd., u.t. 23 yrs., g.r. 3*l.*, r. 68*l.* 580

By F. JOLLY & CO.

Kingsland.—102 to 110 (even), Wilmer-gdns., u.t. 63 yrs., g.r. 105*l.* 1,155
Dalston.—32, Navarino-rd., u.t. 53 yrs., g.r. 6*l.* 5s., e.r. 55*l.* 550

Clapton.—155a, Rushmore-rd. and plot of land in rear, f.; also 57, Overbury-st., u.t. 79 yrs., g.r. nil £545

By TILLETT & YEOMAN.

Wimbledon.—16, 18, and 20, Balfour-rd., f., e.r. 80*l.* 16s. 1,120

By C. SPARROW & SON.

North Finchley.—Dale-gr., Fernside, f., r. 36 500
9, Alexandra-gr., f., r. 60*l.* 980
Whetstone.—Green-rd., a block of freehold land 400

By R. TIDEY & SON.

De Beauvoir Town.—40, Southgate-rd. u.t. 20 yrs., g.r. 4*l.* 10s., r. 40*l.* 305
211, Southgate-rd., u.t. 30 yrs., g.r. 5*l.*, r. 48*l.* 440
Hoxton, 267, New North-rd., u.t. 28 yrs., g.r. 6*l.* 6s., r. 45*l.* 285
Canonbury.—1, Canonbury-rd., u.t. 19¼ yrs., g.r. 7*l.*, r. 45*l.* 265
Islington.—17, Noel-st., f., e.r., 50*l.* 790
Stoke Newington.—73, Aden-grove, u.t. 72¼ yrs., g.r. 5*l.* 375

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.

PRICES CURRENT OF MATERIALS.

TIMBER.

Greenheart, B.G.	ton	£8	0	0	0	0	0
Teak, E.I.	load	10	10	0	15	10	0
Sequoia, U.S., ft. cube		1	9	0	2	0	0
Ash, Canada, load		3	17	6	5	5	0
Birch, do		3	0	0	5	0	0
Elm, do		4	12	6	5	15	0
Fir, Dantsic, &c.		1	10	0	3	10	0
Oak, do		3	5	0	3	15	0
Canada		4	0	0	6	0	0
Pine, Canada red		0	0	0	0	0	0
Do, yellow		4	7	6	6	5	0
Lath, Dantsic, fathom		4	10	0	5	10	0
St. Petersburg		4	0	0	6	10	0
Wainscot, Riga, &c., log		3	15	0	6	5	0
Odessa, crown		3	15	0	6	5	0
Deals, Finland, 2nd and 1st std.	100	9	15	0	10	5	0
Do., 4th and 3rd		9	15	0	10	5	0
Do., Riga		8	5	0	9	5	0
St. Petersburg, 1st yellow		11	15	0	14	5	0
Do., 2nd yellow		10	15	0	12	5	0
Do., white		9	15	0	11	15	0
Swedish		9	15	0	16	15	0
White Sea		10	15	0	18	0	0
Canada Pine, 1st		18	15	0	25	5	0
Do., do., 2nd		13	15	0	17	0	0
Do., do., 3rd, &c.		6	15	0	10	0	0
Do. Spruce, 1st		8	5	0	10	5	0
Do., do., 3rd and 2nd		7	0	0	8	5	0
New Brunswick		7	0	0	7	15	0
Battens, all kinds		5	0	0	16	0	0
Flooring boards, sq., 1 in., prep., 1st		0	9	0	0	15	3
Do., 2nd		0	7	0	0	12	3
Other qualities		0	5	3	0	6	6
Cedar, Cuba, ft.		0	0	4	0	0	4½
Honduras, &c.		0	0	4	0	0	4½
Mahogany, Cuba		0	0	5½	0	0	7½
St. Domingo, cargo av.		0	0	5	0	1	3
Mexican do., do.		0	0	3½	0	0	4
Tabasco, do., do		0	0	4	0	0	6½
Honduras, do.		0	0	4½	0	0	6
Box, Turkey, ton		6	0	0	15	0	0
Rose, Rio		7	0	0	16	0	0
Bahia		6	0	0	14	0	0
Satin, St. Domingo, ft.		0	0	6	0	1	0
Porto Rico		0	0	9	0	2	0
Walnut, Italian		0	0	3	0	0	7½

METALS.

IRON—Pig, in Scotland	ton	2	15	0½	0	0	0
Bar, Welsh, in London		6	0	0	6	5	0
Do. do. at works in Wales		5	15	0	5	17	6
Do. Staffordshire, in London		6	5	0	7	10	0
COPPER—British cake and ingot		75	10	0	76	0	0
Best selected		76	0	0	76	10	0
Sheets, strong		79	0	0	81	0	0
Chili bars		71	10	0	0	0	0
YELLOW METAL	lb.		6½d.			7d.	
LEAD—Pig							
Spanish	ton	14	5	0	0	0	0
English Com Brands		14	10	0	0	0	0
Sheet, English, 6 lbs. per sq. ft. and upwards		15	10	0	0	0	0
Pipe		16	0	0	0	0	0
ZINC—English sheet	ton	30	0	0	0	0	0
Vieille Montagne		31	0	0	0	0	0
Spelter		27	12	6	27	15	0
TIN—Straits		111	2	6	0	0	0
Australian		111	5	0	111	15	0
English Ingots		114	0	0	115	0	0
Banca		0	0	0	0	0	0
Billiton		0	0	0	0	0	0

OILS.

Linseed	ton	18	0	0	0	0	0
Cocoanut, Cochin		29	10	0	0	0	0
Do. Ceylon		25	15	0	0	0	0
Palm, Lagos		24	10	0	0	0	0
Rapeseed, English, pale		22	15	0	0	0	0
Do. Brown		21	5	0	0	0	0
Cottonseed ref.		16	10	0	17	0	0
Oleine		17	0	0	19	0	0
Lubricating U.S.		0	5	3	0	7	6
Do. Black		0	5	0	0	6	6
TAR—Stockholm	barrel	1	6	6	0	0	0
Archangel		0	18	0	0	0	0
Turpentine		32	0	0	0	0	0

TO CORRESPONDENTS.

J. F. B. (below our limit).

NOTE.—The responsibility of signed articles, letters, and papers read at public meetings, rests, of course, with the authors.

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TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays*. N.B.—We cannot publish Tenders unless authenticated by the name and address of the sender; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

BOSTON (Lincolnshire).—For erecting a house on Spilsby-road, Boston, for Mr. B. J. Kent. Mr. Jas. Rowell, architect, Boston. Quantities by the architect :—

J. Lucas	£740	W. Greenfield	£608 10
Parker & Son	675	C. Jessop*	568 10
J. W. Pinder	666	[All of Boston.]	

BERWICK-UPON-TWEED.—For the erection of a police-station, Church-street, for the Town Council. Mr. R. Burns Dick, architect, 55, Northumberland-street, Newcastle :—

Excavating, Masonry, &c.—Elliot & Son, Berwick*	£2,694	10	3
Carpentry and Joinery.—Jno. Burn, Spittal*	965	19	8
Slating and Plastering.—Rule & Sons, Tweedmouth*	460	13	4
Cementing.—Turner & Son, Berwick*	269	0	0
Plumbing, &c.—Geo. McAdam, Berwick*	469	6	9
Smithing.—Elliot & Sons (sub-contract)*	100	2	0
Painting.—Richardson & Co., Berwick*	82	0	0
	£5,041	12	0

BRIDLINGTON QUAY.—For the erection of buildings at back of Beverley House, Quay-road, for Messrs. Neal & Son. Mr. S. Dyer, architect, Bridlington Quay :—

E. Corner	£275	W. Barnes, Travis-street, Bridlington Quay*	£240
T. Weldon	250		
J. Spink	245		

CARDIFF.—For the erection of a pavilion, Cathay's Park, for the Committee of the National Eisteddfod. Mr. G. Thomas, architect, Queen's-chambers, Cardiff. Quantities by the architect :—

W. H. Ingleson	£1,974	Jones Bros., Cardiff*	£1,860
Geo. Martin	1,900		

ELGIN, N.B.—For the erection of a public school, Deskford, for Deskford School Board. Mr. Fowlie, architect, Cullen House, Cullen, N.B. :—

Masonry.

Cruickshank	£299 0
Stewart, Keith, N.B.*	296 5
Gray	290 15

Carpentry.

Arthur Duffus	£247	Gordon, Deskford, Cullen*	£198
Davidson	236		

Slating.

Rumbles	£74 14 6	Mitchell	£68 15 0
Desson	74 4 6	Macdonald, Portsoy, N.B.*	54 14 0
Taylor	73 4 6		

Plastering.

Ingram, Cullen, N.B.*	£38

Plumbing.

Armand	£79 15	Beveridge	£48 15

LEVEN, N.B.—For the erection of twenty-four houses, Lumphinnans, for the Fife Coal Company, Limited. Mr. J. Houston, architect, Dunfermline. Quantities by the architect :—

Building.—Wm. B. Street	£1,100
Joinery.—Thomas Laing	792
Plumbing.—Binning & Sons	101
Plastering.—Paul & Sons	350
Slating.—Paul & Sons	250

LONDON.—For alterations, additions, and fittings at the "Crooked Billet" public-house, King David-lane, Shadwell, E., for Messrs. Erbach Bros. Mr. Fred. A. Ashton, architect, 177, Romford-road, Stratford, E. :—

	Alterations, &c.	Fittings.	Total.
W. Harper	£1,001	£938	£1,939
Wall & Co.	948	905	1,853
J. & H. Cocks	900	899	1,799
Williams & Sons	827	900	1,727
W. G. Maddison	835	804	1,639
A. E. Symes	786	761	1,547

LONDON.—For building mineral water factory, for Mr. D. Sterry, at Narrow-street, Limehouse, E. Mr. J. G. Needham, architect, 18, Lower Clapton-road :—

T. H. Jackson*	£450

LONDON.—For alterations to "Woolsack" public-house, Ida-street, Bromley, E., for Mr. Sam Waller. Mr. J. G. Needham, architect, 18, Lower Clapton-road :—

W. J. Maddison	£630
T. H. Jackson (after reducing)*	544

LUTON.—For the erection of Wesleyan Schools, Waller-street. Messrs. J. R. Brown & Son, architects, 17, Market-hill, Luton :—

George Smart	£4,800	T. & E. Neville, Castle-street*	£4,190
W. G. Dunham	4,498	[All of Luton.]	
G. W. Pryer	4,350		

MORECAMBE.—For the erection of five houses, Lancaster-road, for Mr. J. Bond. Messrs. Marshall Bros., architects, Back-crescent, Morecambe :—

All trades except Plumbing, Glazing, and Painting.

W. Pool	£1,770 10

Plumbing and Glazing.

J. P. McNair	£164 12 6

PRUDHOE-ON-TYNE.—For rebuilding the "Dr. Syntax" Hotel. Mr. R. B. Dick, architect, 55, Northumberland-street, Newcastle :—

N. Maughan	£4,206 9 3	Armstrong	£3,511 11 5
Smithson & Son	4,170 0 0	S. Sheriff, S. Shields*	3,473 0 0
J. & W. Lowry	4,082 17 0		
T. & R. Lamb	3,791 3 3		

RUSHDEN.—For erecting two houses on Rushden-hill for Mr. Garner, of Higham Ferrers. Mr. H. Knight, architect, Rushden :—

F. Henson	£789	T. Willmott	£756
T. Swindall	784	W. Packwood	745
T. & C. Berrill	772	Dickens Bros.	703
E. Mitchell	760	Hacksley Bros.†	703
H. Sparrow	759		

SOOTHILL (Yorks).—For the erection of two blocks of cottages, Leeds-road, for Mr. Thomas Newsome, Dewsbury. Mr. H. H. Hall, architect, Shaw Cross, near Dewsbury. Quantities by architect :—

Masonry.—Ellis & Sons, Ossett*	£810
Joinery.—Albert Day, Hangingheaton*	231
Plumbing.—B. Scott, Leeds-road*	36
Plastering.—Wm. Parker, Heckmondwike*	70
Slating.—W. H. Thompson, Batley*	65

STAINCLIFFE (Yorks).—For altering four buildings into cottages, Highfield, for the Batley Corporation. Mr. J. C. Barrowclough, engineer, Town Hall, Batley :—

Masonry.—H. Crosland, Staincliffe.*
Joinery.—T. Illingworth, Batley.*
Plumbing.—E. Walker & Co., Heckmondwike.*
Plastering.—W. Parker, Heckmondwike.*
Painting.—S. Waller, Batley-Carr.*
[Schedule.]

STAPLEFORD.—For the erection of a chapel. Mr. Hy. Harper, architect, 8, Beastmarket Hill, Nottingham. Quantities by the architect :—

C. Moult, Stapleford	£1,700 0 0

WORKINGTON (Cumberland).—For extensions to Vulcan's-lane Stores, Workington, for the Bee Hive Co-operative Society, Ltd.. Workington. Messrs. W. G. Scott & Co., architects, Victoria-buildings, Workington :—

Masonry.—G. Mann*	£689 0 0
Joinery.—J. Steel*	620 0 0
Slating.—Lythgoe & Sons*	77 7 6
Plastering.—G. Mann*	176 0 0
Plumbing.—D. M. Walker*	122 0 0
Painting.—W. T. Sherwood*	65 0 0
	£1,749 7 6

[All of Workington.]

LONDON SCHOOL BOARD TENDERS.

* Denotes accepted.

Exterior Painting. The Work at the Following Schools will be Executed between April 8 and May 6, 1899.

ADDINGTON-STREET :—

Edwards & Medway	£155 16	B. E. Nightingale	£120 0
Hooper & Son	150 0	G. Brittain	118 0
H. Brown	148 0	E. Triggs*	105 0

BASNETT-ROAD :—

H. Brown	£193 0 0	Garrett & Son	£149 0 0
C. Gurling	166 0 0	E. B. Tucker	137 17 6
Holloway Bros.	154 0 0	Bulled & Co.	120 0 0
Johnson & Co.	150 0 0	E. Triggs*	103 0 0

HIGH-STREET (except new offices) :—

Collis Willmott	£145	Chessum & Sons	£111
A. W. Derby	129	G. Wales	105
Snewin Bros. & Co.	124	Silk & Son	97
W. Shurmur	115	S. H. Corfield*	89

HITHER GREEN :—

C. S. Jones	£145 10 0	W. Hornett	£120 0 0
Hayter & Son	135 0 0	W. Banks*	117 12 6
C. G. Jones	125 0 0		

JAMES-STREET :—

B. E. Nightingale	£105 0	Bristow & Eatwell	£77 15
Lathey Bros.	96 0	T. Cruwys	73 15
G. Foxley	95 0	W. Chappell*	65 0

NAPIER-STREET :—

Silk & Son	£316 0	G. Barker	£159 0
J. F. Holliday	185 0	G. Wales	158 16
Marchant & Hirst	185 0	A. W. Derby	149 0
Johnson & Co.	174 0	S. H. Corfield*	147 0

RANDALL PLACE :—

S. Musgrove	£174 12 0	C. Foreman	£144 0 0
Somerford & Son	159 0 0	Jones & Groves	138 10 0
W. Banks	151 12 6	E. Proctor*	120 0 0

SAFFRON HILL :—

W. Bunce	£247	G. Foxley	£190
Wall & Co.	225	J. Kybett	170
Wagstaff & Sons	217	E. Flood	152
T. Cruwys	198	W. Chappell*	115

STATION-ROAD :—

F. Britton	£215	C. & W. Hunnings	£125
Grover & Son	162	Gardner & Hazell	103
McCormick & Sons	147	Stevens Bros.*	98

SUMNER-ROAD :—

Freeman & Son	£342 15	Akers & Co.	£197 7
Martin, Wells, & Co.	324 10	G. Kemp	185 0
J. F. Ford	275 0	H. Line	171 0
Hooper & Son	230 0	Rice & Son*	163 0
W. V. Goad	218 0		

TOWNSEND-STREET :—

W. V. Goad	£279	E. Triggs	£187
H. J. Williams	268	E. Proctor	170
White & Co.	249	Johnson & Co.*	163
Holliday & Greenwood	187		

VICTORIA (Old School) :—

S. Polden	£167 0	W. Brown	£102 0
G. Neal	148 0	R. S. Buckeridge	93 0
W. Hornett	139 18	Bristow & Eatwell	82 3
W. Hammond	114 0	F. T. Chinchen	78 19
H. C. Clifton	110 0	W. R. & A. Hide*	75 10

[*See also next page.*

WOOD'S-ROAD :—

Freeman & Son	£660 10	Garrett & Son	£224 0
Martin, Wells & Co.	302 10	Akers & Co.	217 19
J. F. Ford	283 10	G. Kemp	215 0
H. Line	225 0	Rice & Son*	193 0

Painting (between May 6 and June 3, 1899) the exteriors of the following schools :—

AMBERLEY-ROAD :—

T. Cruwys	£213 0	Bristow & Eatwell	£121 15
Marchant & Hirst	198 0	F. T. Chinchen	114 10
H. C. Clifton	163 0	W. Chappell*	105 0

BELLEVILLE-ROAD :—

Bulled & Co.	£161 0	E. B. Tucker	£133 6
Williams & Sons	149 10	H. Brown	126 10
Johnson & Co., Ltd.	144 10	E. Flood*	124 0
R. S. Ronald	138 0		

DULWICH HAMLET :—

J. & C Bowyer	£128 0	Mitchell & Sons	£97 10
C. S Jones	120 0	J. F. Ford	94 0
Jones & Groves	112 0	H. Line*	91 0

HOLLAND-STREET :—

Lathey Bros	£107 0 0	B. E. Nightingale	£74 0 0
Spencer, Santo, & Co., Lim.	103 15 0	Holliday & Greenwood	69 0 0
W. Hornett	90 0 0	E. Flood*	66 16 6

JESSOP-ROAD :—

Hooper & Son	£167 2 6	Somerford & Son	£113 0 0
Heinemann & Brown	160 1 6	Garrett & Son	105 0 0
F. R. Blaxton	142 0 0	Rice & Son	95 0 0
Holloway Bros.	129 0 0	Holliday & Greenwood*	89 15 0
Akers & Co.	126 13 0		

MAIDSTONE-STREET :—

Collis Willmott	£183	J. Kybett	£157
J. Haydon	182	G. Barker	141
Snewin Bros. & Co.	175	G. Wales	112
W. Shurmur	168	A. W. Derby*	107

MAWBEY-ROAD :—

W. V. Goad	£288 0 0	Johnson & Co.	£222 0 0
W. Banks	237 10 6	G. Kemp	219 0 0
E. Proctor	230 0 0	H. J. Williams*	193 0 0

ST. PAUL'S-ROAD :—

T. H. Jackson	£191 0	J. F. Holliday	£148 10
Johnson & Co.	189 0	A. W. Derby*	121 0
J. Kybett	163 0		

SCAWFELL-STREET :—

W. Shurmur	£148	Marchant & Hirst	£124
J. Haydon	143	G. Barker	122
J. Kybett	139	G. Wales*	117
S. H. Corfield	130		

WATERLOO-STREET :—

G. H. Sealey	£290 10	W. Brown	£99 10
Martin, Wells, & Co.	205 0	R. S. Buckeridge	99 0
S. Polden	127 6	F. F. Chinchen	96 13
C. Gurling	113 0	W. R. & A. Hide	95 15
Bristow & Eatwell	109 17	F. Chidley*	94 0

WEBB-STREET :—

Hayter & Son	£250 0	Bulled & Co.	£205 0
Spencer, Santo, & Co., Lim.	245 10	E. Triggs	190 0
White & Co.	240 0	H. J. Williams	185 0
W. Hornett	220 0	Johnson & Co.*	184 0

YERBURY-ROAD :—

F. Britton	£332 0	Stevens Bros.	£242 0
Wall & Co.	321 0	C. & W. Hunnings	221 15
McCormick & Sons	296 0	Gardner & Hazell	187 0
Grover & Son	259 0	R. S. Buckeridge*	182 10

VITTORIA-PLACE.—Painting interior (during the Midsummer holidays) :—

Gardner & Hazell	£647 0	F. Britton	£503 10
T. Cruwys	556 0	Marchant & Hirst	495 0
A. W. Derby	536 0	G. Barker	395 0
Stevens Bros.	514 0	W. Bunce*	359 0

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— OF THE —
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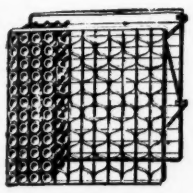

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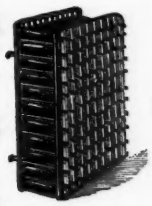

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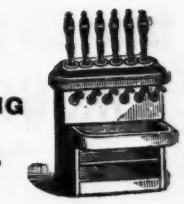

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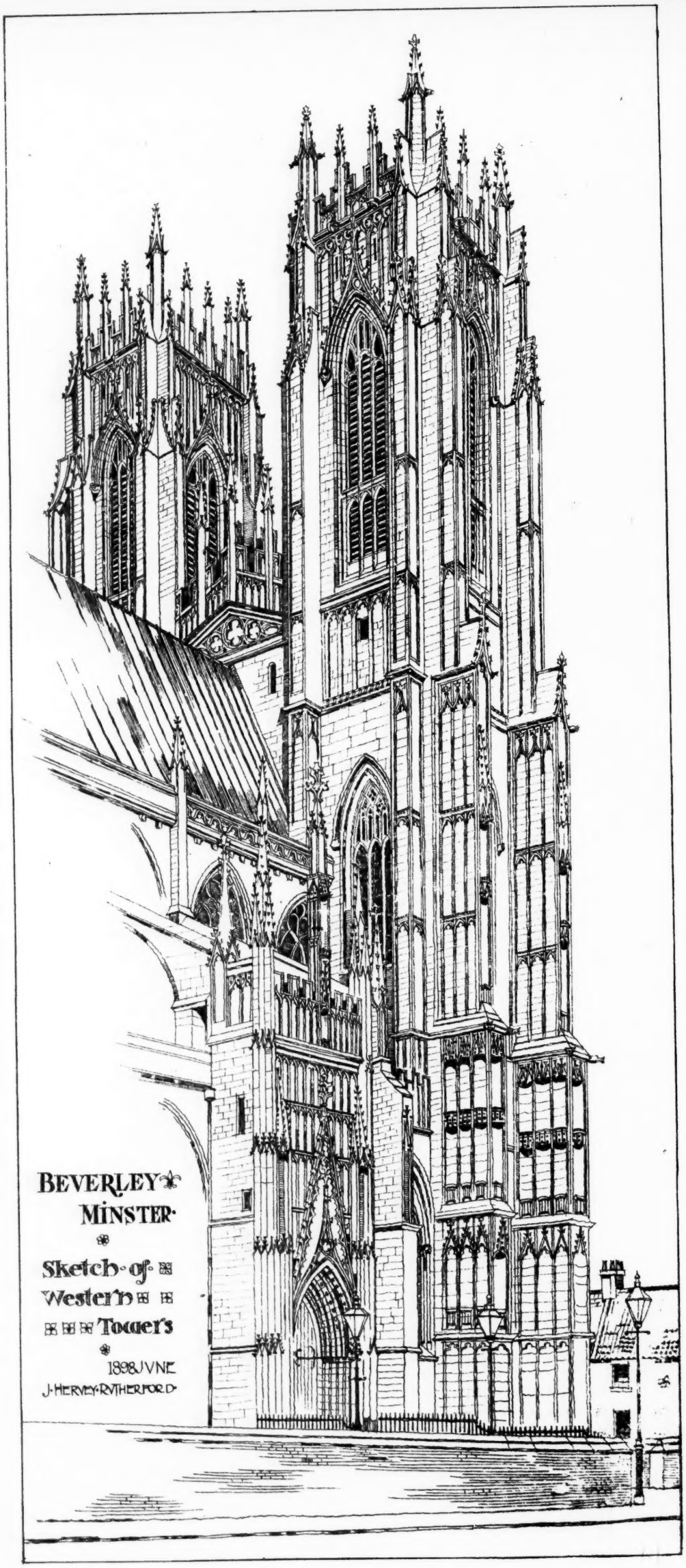

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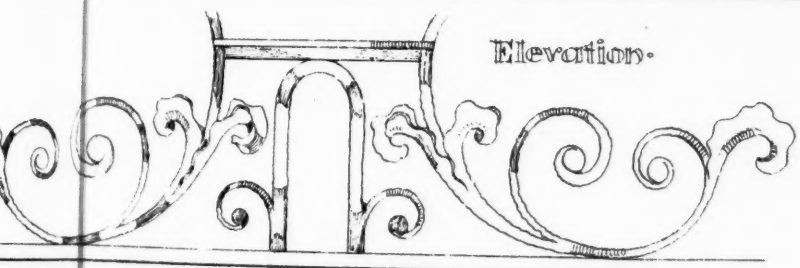

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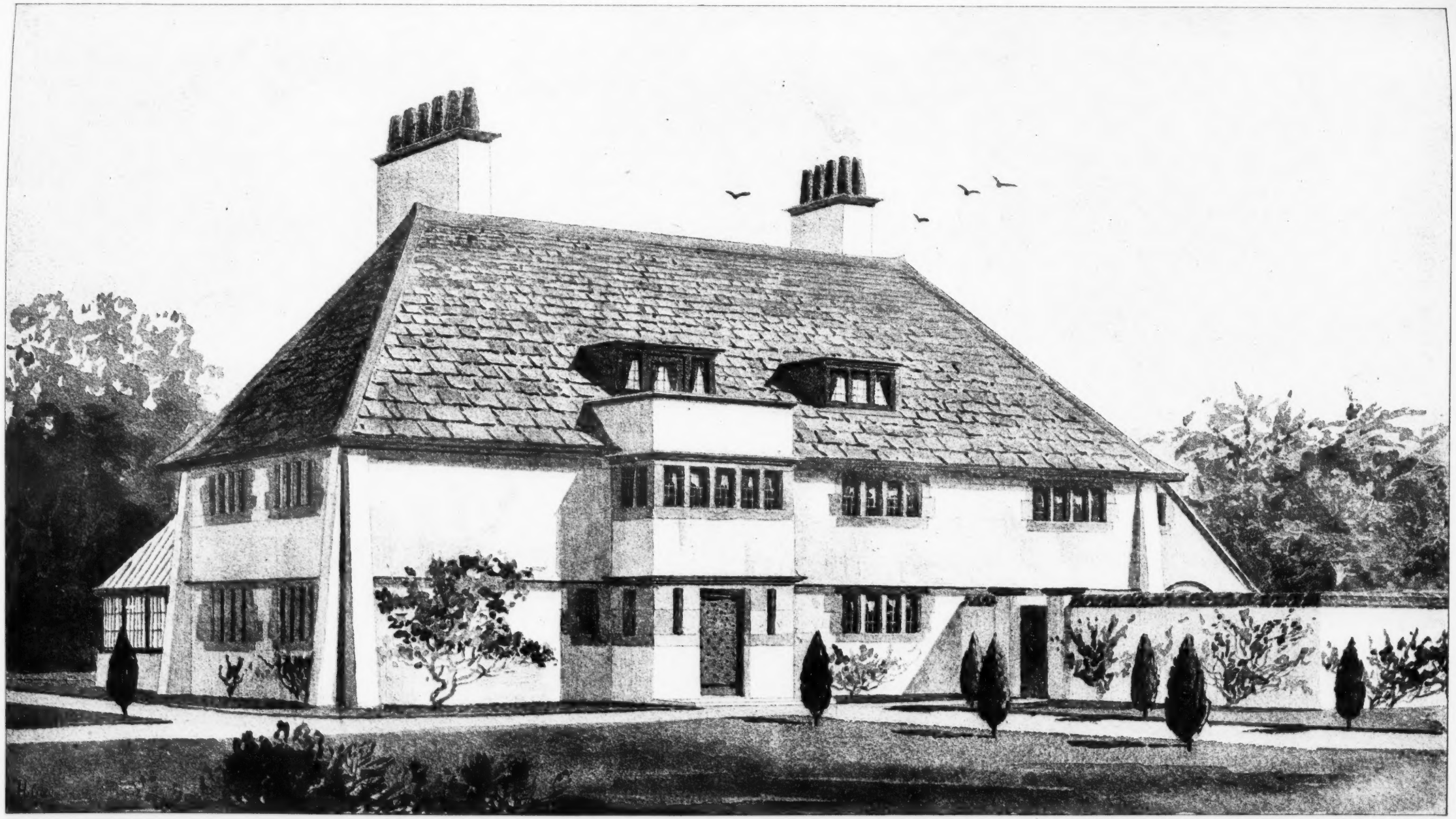
INK-PHOTO SPRAGUE & C[illegible], 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

HOUSE AT LIMPSFIELD, SURREY.—Mr. C. F. A. Voysey, Architect



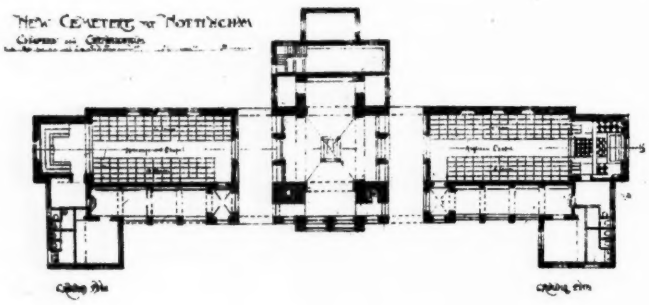
INK-PHOTO, SPRAGUE & CO LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

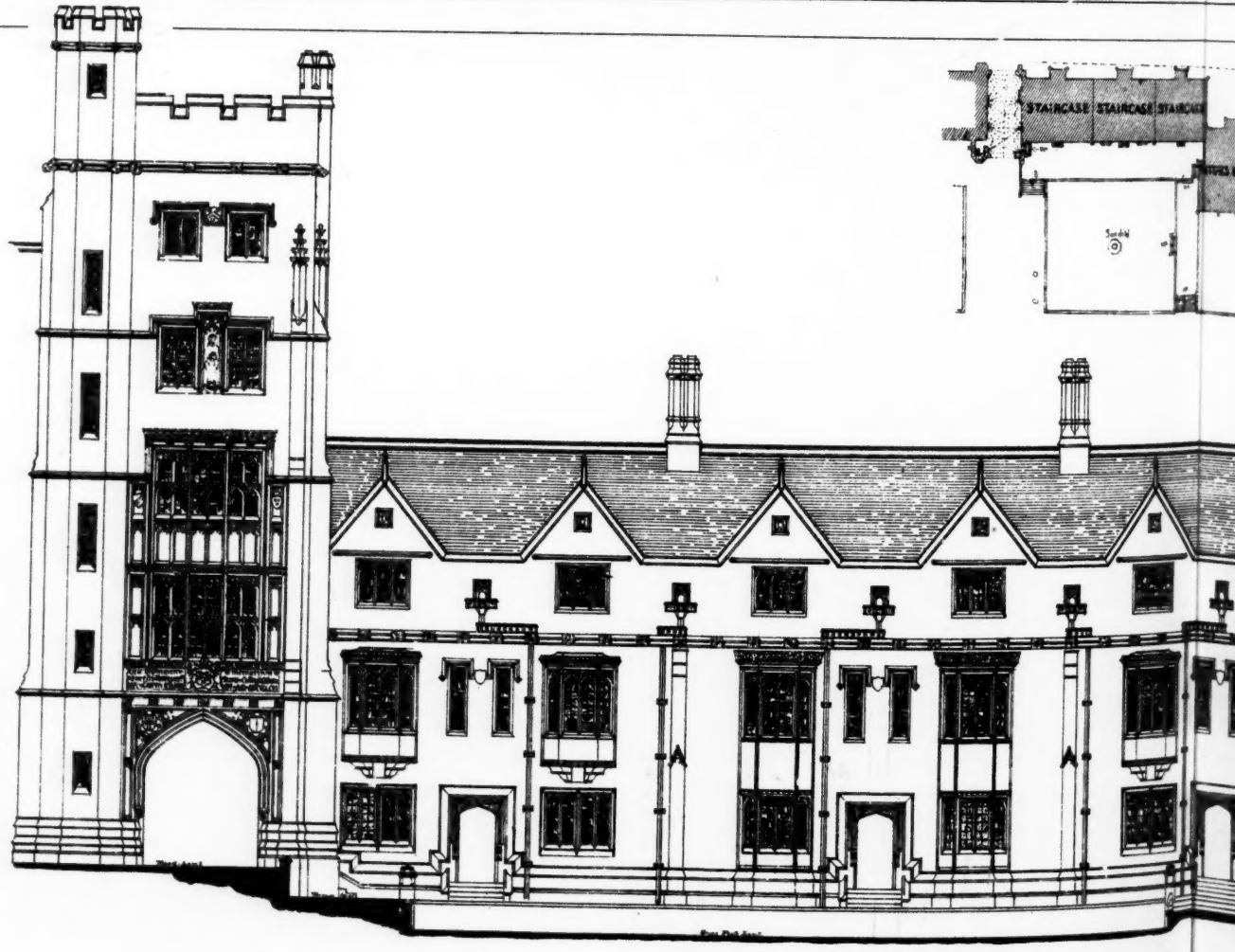
HOUSE AT THORPE MANDEVILLE, NORTHANTS.—Mr. C. F. A. Voysey, Architect

NEW CEMETERY AT NOTTINGHAM.

CHAPELS AND CREMATORIUM.

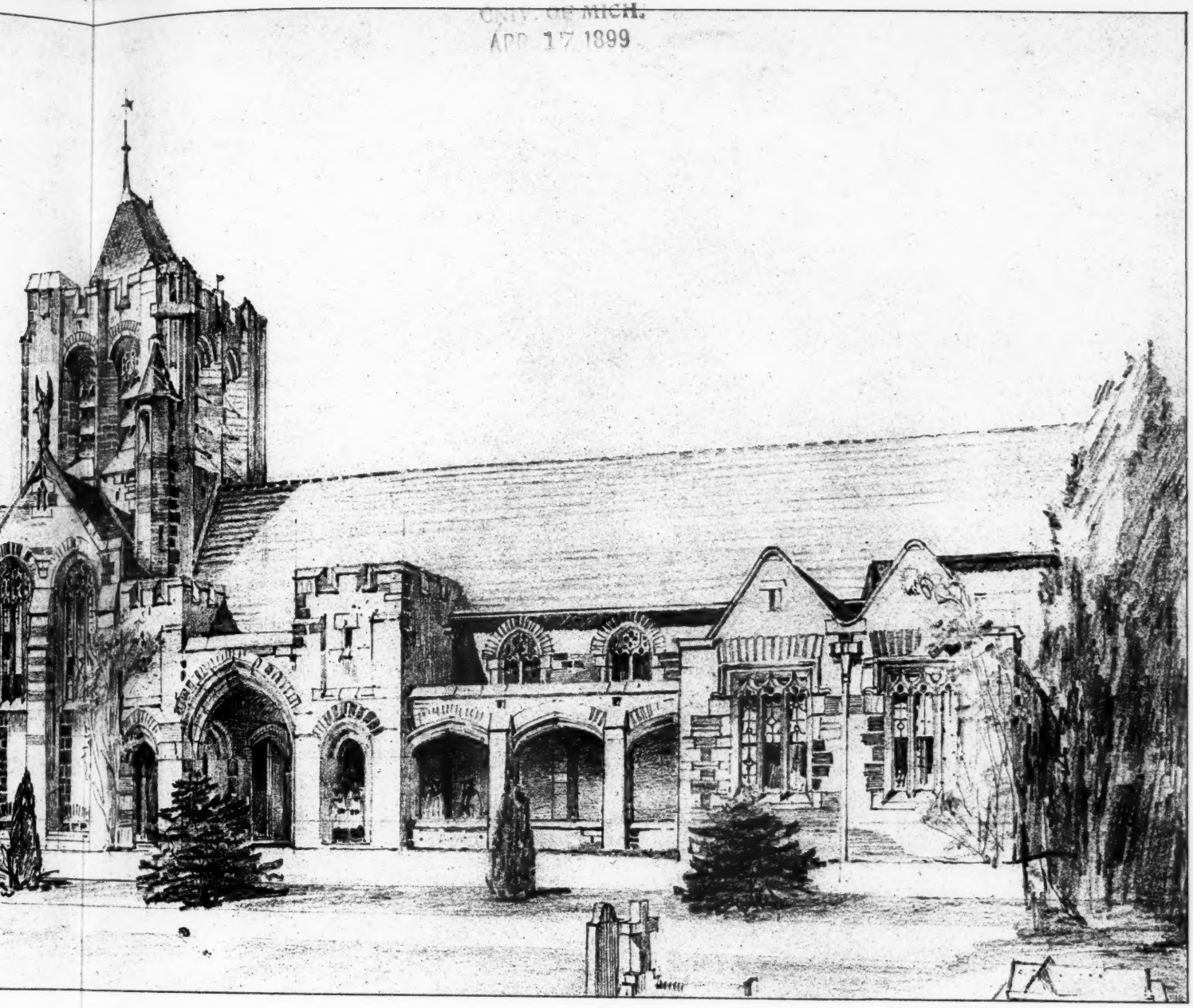
Charles A. Nicholson
Herbert E. Collett. } Architects, 22 Theobald's Road, Bedford Row, W.C.

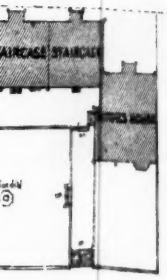




ROBINSON MEMORIAL TOWER, NEW COLLEGE,

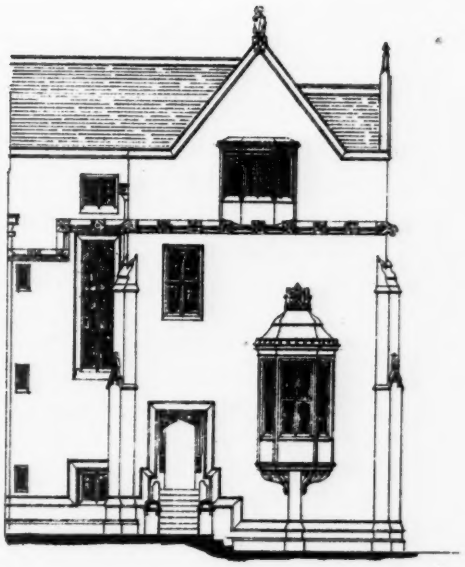
GENERAL LIBRARY,
UNIV. OF MICH.
APR 17 1899





NEW COLLEGE, OXFORD.

TUTORS HOUSE



RETURN SIDE OF TUTORS HOUSE

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3.

DESIGNS FOR
WALL-PAPERS.

By
Mr. C. F. A. Voysey.

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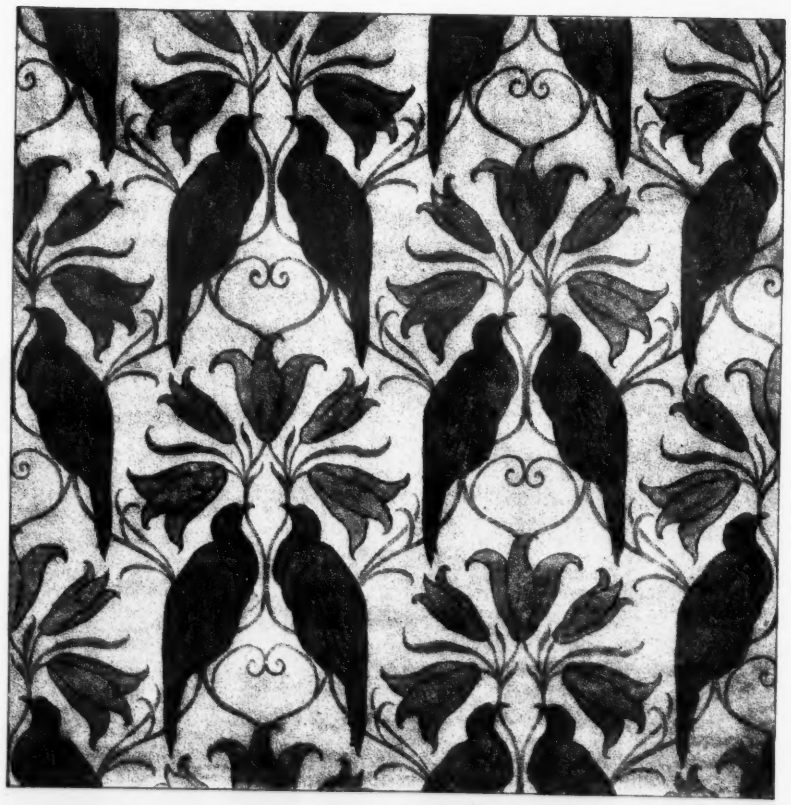
4.



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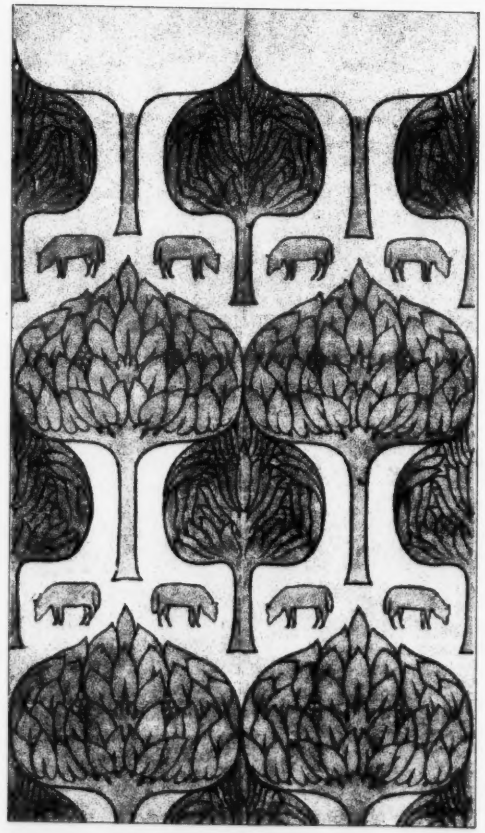

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